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NOV/2018

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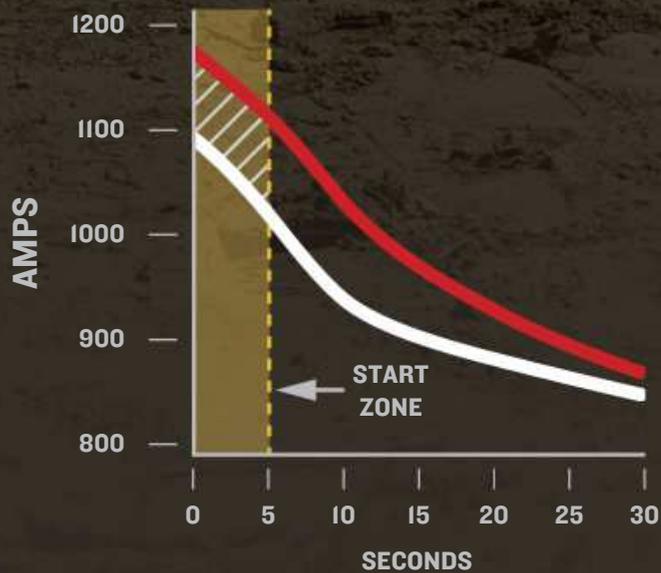
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by Jared Gall

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Five-hundred-horsepower sports coupes for the merely wealthy.

photography by Anton Watts

Car and Driver. vol. 64, no. 5

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“Then we took off sideways out of the parking lot, grinning like goldfish-brained idiots.”

—JARED GALL, LONG-TERM TEST: 2017 BMW M2

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(Sorry, no time to write a blurb here. We're too busy eating all these steaks.)

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DIFFERENTLY

Emerson Fittipaldi.

On the Web

TESLA MODEL 3 PERFORMANCE

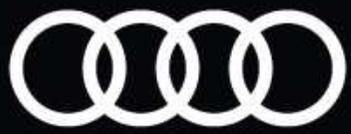
The tweaked Model 3 trades Ludicrous acceleration for ridiculous cornering. [CarandDriver.com/2018TeslaModel3Performance](#)

ASTON MARTIN V8 CYGNET

This 430-hp microcar was built at one customer's outlandish request. [CarandDriver.com/AstonMartinV8Cygnet](#)

KIA FORTE

Just don't take this sedan's Stinger-like looks too literally. [CarandDriver.com/2019KiaForte](#)



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Backfires:

The joyful noise of the commentariat, rebutted sporadically by Ed.

THE BIG SCORE

You spineless pussbags are more than eager to crucify any reader who dares question your almighty scoring system. “We can’t arbitrarily remove a category!” you bleat, batting away criticism. Now we learn you’ll mess with the system when it pleases you [“Outer Limits,” August 2018]. What’s the matter? Porsche threaten to revoke your access to cars? *Achtung!* The Chevy won that competition; readers know it, and you know it. Apparently, Porsche’s press-fleet manager knows it, too.

—Matthew Guy
Halifax, NS

Pussbags? Us?—Ed.

Realizing *C/D* had a bias toward BMW and Porsche over the years, I have gotten used to some of the stacked comparisons. However, the one-point separation of the Corvette ZR1 from the 911 GT2 RS was too much. To your credit, you openly set aside the price factor—okay. But buried in the detailed scoring, for exterior styling, you give Porsche a 10 but the Vette an eight. That is so absolutely absurd. The 911 still maintains the appear-

ance of an aerodynamic squashed toad, a basic characteristic for the past several decades, currently with better paint. Simply reversing that one score changes the winner and restores some credibility to your magazine.

—Thom Taylor
Hartfield, VA

Geez. You guys never fail to crack me up. In order to award the GT2 RS first place meant “. . . removing the Corvette ZR1 from the picture.” Huh? Take the competition out of the race to make the comparison? Even then, it was a one-point race. You remind me of the kid who trades two ham sandwiches, chips, homemade cookies,



“THE 911 STILL MAINTAINS THE APPEARANCE OF AN AERODYNAMIC SQUASHED TOAD, A BASIC CHARACTERISTIC FOR THE PAST SEVERAL DECADES, CURRENTLY WITH BETTER PAINT.”

milk, and an apple for a Twinkie—a \$348,730 Twinkie. I’m not your mom, but even I know that’s a bad trade. For the money (if I had it . . .), I’d rather buy a Vette and a decent pickup and still have around \$150K in gas money.

—Tiger Aserlind
Silverthorne, CO

Speaking of trades, I once traded an Ewok action figure for a Dagobah playset, foam quicksand and everything—Ed.

Yeah, I’ve heard you say quite a few times in the past that the Corvette has to go mid-engine. Your “Outer Limits” piece reiterates it. However, the ZR1 still outbrakes, outcorners, and outslaloms the GT2. Going mid-engine may help keep the Corvette from

getting its ass handed to it during acceleration, but if it is just a traction problem, then the zero-to-150-mph and quarter-mile trap-speed numbers should be closer. Power-to-weight ratios are equal.

Maybe some of the ZR1’s 755 horses are sleeping or the GT2 RS really has 800 in the corral.

—J.P. San Mateo
Metro Manila, Philippines

Assigning a comparison score to fuel economy, as if prospective buyers would give a shit after purchase price has been made immaterial? Get real. If nothing else, ZR1 buyers can sleep well knowing they’ll have \$200K more fuel to guzzle on than any thrifty GT2 owner.



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Chevy takes this round handily.
 —Blake Copley
 Carstairs, AB

Take off a point for the Porsche's fake exhausts and you have a tie.
 —Tim C. King
 Reno, NV

The Corvette sounds like an awesome car, but speaking of sounds: ZL1, Z06, Z24, Z/28, Z66, and Z71 = Zzzzzzzzzzzz.
 —Paul Stegeman
 Cold Spring, KY

According to my Time Life books, the infamous gunfighter and outlaw John Wesley Hardin once shot a man just for snoring—Ed.

Glad to see you're still on the payroll from Porsche! By the way, read a few other auto magazines this weekend and found *Car and Driver* came in last under "most fun to read."
 —Chris Manning
 Taylors, SC
I really hope running this letter improves our score—Ed.

I have enjoyed *Car and Driver* for several years, especially your unbiased (I thought)

comparison tests. Changing the scores in your article on the 2018 Porsche 911 GT2 RS versus the 2019 Chevrolet Corvette ZR1 was certainly not unbiased.

I recently received my annual renewal for your magazine, which I am not renewing primarily due to the comparison I mention above.

—Gary E. Vielle
 Sparks, NV

You guys realize that we made up the scoring system in the first place, right? That it was not handed down on two tablets from Mount Sinai? Speaking of Mount Sinai, I have to get my pancreas checked—Ed.

TINY DANGERS

Your test of small SUVs from BMW, Jaguar, and Volvo ["City Mice, Country Mice," August 2018] took me back to mid-May, when I had a chance to do same-day test drives of a \$51,000 X2, a \$45,000 XC40, and a sub-\$33,000 Mazda CX-5 Grand Touring. Had I been allowed to drive blindfolded, I wouldn't have been able to tell the dif-

ference among the three. And, frankly, the Mazda's interior was the nicest. My brief comparison test confirmed to me that the lines have started to blur between mainstream and luxury brands, and it reaffirmed my view that paying through the nose for a BMW doesn't always guarantee a great ride.

—David Fluhrer
 Glen Cove, NY

In your comparison of compact luxury SUVs, the Lincoln MKC was not even mentioned. I know that anything with the Lincoln name does not register, but I think the MKC would stand on its own merits. I have a 2017 Reserve model with the 285-hp 2.3-liter engine. It is fast, luxurious, and a good-looking vehicle. The size is just right for urban living, with enough room for most requirements. The car is now a year old and the only service required has been one oil change. While I have always been a Jaguar fan, I find the interior of the E-Pace very drab and not up to the standards of the past, and

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it does not match the Lincoln.

—Barry Lurges
Victoria, BC

By our measure, the MKC is a size up on these little SUVs. It competes within the Audi Q5, BMW X3, Cadillac XT5 class—Ed.

I smell a rat. It smells like BMW had to win the comparison test. How much wine and steak does BMW treat you to each month? Did I miss an article where the “winning X1” won a battle against the XC40 and E-Pace? The X1 is clearly the form factor of the comparison vehicles. The X2 is just a hatchback sedan with a lower center of gravity. [Um, no. It’s a rebodied X1 that is 2.8 inches lower—Ed.] So, guess what? It performed more like a car. Get an XC40 with the active suspension and a Polestar tune (it would still be less expensive than the BMW or the Jag in this test) and see how it compares with the BMW X2, or better yet, against the “winning X1.” To me, it smells like the Germans are slipping

you some cheese to include a rat in the mice comparison.

—Jerry Hooper
Baton Rouge, LA

Okay, Hooper, but guess who pays for my gout medication—Ed.

The BMW X2 and the Volvo XC40 are listed as having the exact same gear ratios. I am just getting into the mechanics of cars and curious if it’s common for two makes to have identical ratios for their transmissions.

—Bill Himpele
Lansdale, PA

It’s not as uncommon as you might think. Both the XC40 and X2 use the same Aisin eight-speed automatic, ratios and all—Ed.

GEOLOGY CLASS

Thanks so much for the hilarious coverage of the Geo Metro race [“Battle of the Beaters V: The Craigslist Cup,” August 2018]. I appreciated the story for the humor but also because I owned a ’92 Metro in my college days. In the late ’90s, I could fill the tank for \$8 and drive it for two

“THE CRAIGSLIST CUP ROMP WAS INSPIRED PURE DELECTABLE C/D GOLD LUNACY AND IS THE KIND OF THING THAT WILL KEEP ME SUBSCRIBING FOREVER.”



weeks. Remarkably, I nearly totaled the car in a wreck with a semi and came away without a scratch!

Those cars weren’t pretty, but they certainly were more durable than they get credit for. I look forward to the next beater battle with great enthusiasm.

—Chad Cain
Evansville, IN

I bought a 1985 Chevy Sprint new in 1986, a stick but no radio or A/C, and I went for an unlimited-mileage four-year extended warranty. I used it as a courier and put 485,000 miles on it. Changed the oil every other weekend. Everything including the driver’s seat broke and was replaced by the dealer after a \$25 deductible. Bearings replaced at least three times, starter, alternator, basically anything that could be bolted onto the car broke and was fixed for \$25. I would pull over on the side of the road and throw a set of pads on the front rotors every now and then. After the warranty ran out, the transmission failed and I sold it to a guy

who needed the carb for one he was fixing.

—Ted Lovejoy
Bristow, VA

Seriously? You guys actually paid \$1000 to \$1250—apiece!—for the crap-can Geo Metros used in your Craigslist Cup stunt? Somewhere, George must be laughing his ass off. At the low-end public auto auction where I work part time in retirement, a \$1250 budget could have supplied an entire four-car field of way better stuff than that, with probably enough left over to provide a beer and a burger outing for all the hapless competitors.

—Dave Stine
Ijamsville, MD
Ijamsville sounds like it was founded by Deadheads and Phish lovers—Ed.

The Craigslist Cup romp was inspired pure delectable C/D gold lunacy and is the kind of thing that will keep me subscribing forever. It should have been your cover story, instead of whining about irrelevant eccentricities on a couple of mismatched supercars. Next year, make it so.

This is now a must-do annual event.

—Timothy Aines
Northbrook, IL

Reading stuff like this is way more fun than reading about fancy new sports cars! I’d almost forgotten about the Geo Metro.

—Jeff Kelson
Lafayette, CO

I know that writing for C/D must have some stress and actually require work. But I have to say that “Battle of the Beaters V: The Craigslist Cup” convinced me that you are having way too much fun!

—Tom Miller
Lewisburg, PA

It gladdens my critic’s heart to see an issue with thematic unity. In August, we have zoological roadkill on page 046 and mechanical roadkill on page 070. I salute your ingenuity.

—William Coulter
Lynchburg, VA

In his August column, Pund admitted to repurposing the heated-washer-fluid system in a Cadillac DTS as a coffee-dispensing system that he drank from and,





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in the beaters story, to racing a sketchy Metro on the highway at 70 mph on tires more brittle than the hornets' nest under the car's hood. Which is admirable but led me to one inescapable conclusion: Pund has to be that guy who walks into his 20-year high-school reunion and everyone thinks to themselves, "Wow, well, look who's still alive."

—Greg Fulton
Maple Valley, WA

Those are wasps, not hornets!

—Harry Williams
Winterville, GA

Yeah, Fulton—Ed.

MANIMAL

Regarding the map on page 047 of the August issue, it is unclear what is being measured ["Roadkill"]. For example, if the incident rate for hitting a deer in West Virginia is 1:43, what does 43 represent? Miles? Trips? Days? Drivers?

—John Paone
Mashpee, MA

It means that statistically one out of every 43 drivers in West Virginia will hit a deer in a 12-month period—Ed.

Letter of the Month:

Your August issue of *Roadkill and Driver* did not include any recipes. What gives?

—Steve Kish
Pleasanton, CA

MY TWO SCENTS

Thank you for only having two exterior shots of the 2019 Subaru Ascent ["Re-Forester," August 2018], as it is almost as ugly as the Forester, which looks like every drawing of a car my eight-year-old makes.

—Todd Gemelli
Hancock, MI

ON PRANCER

Ed., somebody needs to sit down with Tony Quiroga and tell him that only three thoughts should go through the mind of a real man when he's handed the keys to a Ferrari 488 Pista ["Berlinetta Solitaire," August 2018].

- 1) How fast will this thing go? THE GOOD
- 2) Is the radar detector/jammer working? THE BAD
- 3) Where is the nearest Reform School for Community College Girls? THE UGLY

—Lee Van Queef
Coopersville, MI

Real men sign their real names, Van Queef—Ed.

While Quiroga is quite correct that *pista* is Italian for "track," it is also an adjective for "unpleasant discov-

Explained: A Sound Answer

To me, the quietness of a car is a very important consideration. I appreciate the information you provide on this in your full tests. But do you always test on the same stretch of road for the 70-mph-cruising result? Some roads are much quieter than others. Your recent article on the Subaru Ascent listed 64 decibels at 70 mph ["Re-Forester," August 2018]. This is luxury-car territory.

I am in the market for a quieter car. If you use different roads, there is a problem. I would hope you use the same road each time. Am I correct?
—Herm Faubl, Huntley, IL

As you note, road surfaces vary widely and can have a significant impact on noise levels, which is why we work to control for road surface as much as possible. Our sound-level measurements typically come from one of two roads, depending on whether we test in Michigan or California. The Ascent's 64-decibel figure came from our West Coast test track, which is quieter than the road we use at the home office. A different Subaru Ascent wearing the same tires recorded a 67-decibel 70-mph-cruising sound level in Michigan for our September 2018 comparison test ["Going Up"]. Test results that include sound measurements also mention where vehicles are tested. And we only include sound levels in our road-test spider charts if all the vehicles are tested on the same surface —Ed.

ery at a Ferrari dealership." Example: "I sure was-a pista when I find-a out that-a my new, trillion-dollar Ferrari no come-a with a free olio change!"

—Rod Marriott
Saint Catharines, ON
Terrible ethnic stereotypes aside, new Ferraris come with seven years of free general maintenance—Ed.

PIZZA THE HUT

Despite unsuccessful efforts to imagine holding a cellphone like a slice of pizza [Editor's Letter, August 2018], kudos to Eddie Alterman for his on-the-money piece. These holding-cells-to-ears types often create barely moving lines of cars at intersections and

elsewhere with their distracted driving.

One of my pet peeves about such motorists, and distracted drivers in general, is that they fail to turn immediately on those brief-cycle left-turn arrows, especially at photo lights. They almost always get through the intersection, but the rest of us must endure another, usually painfully protracted cycle. The next time you are in a hurry, note the interval between the first and second cars managing to finally turn on a green/yellow arrow. If both of those drivers were distracted, the interval can be as much as several car lengths.

—Douglas Mandel
Lindenhurst, IL

Having just finished reading Alterman's letter in the August issue, I'm reminded of my beloved wife. A few years ago, I upgraded the stereo in her pre-Bluetooth Civic with a fully modern Pioneer unit, motivated by the idea that she would love the ability to use her phone hands-free and stream audio. How wrong I was. She steadfastly refuses to learn how to use the new unit, preferring to perform the same "pizza" phenomenon described by Alterman. My wife is in her mid-30s and no Luddite (she works in tech), but clearly there are those who can't be bothered to learn something new.

—Luke Mullen
Lafayette, CO



Thank you, Mr. Alterman, for your frequently precise comments on one of our favorite activities. I live in southwest Florida and daily experience the lane drifts, missed stop signs, and run reds due to phone use while driving. I would say, though, that your solution with Bluetooth misses one important point. Getting the phone to connect reliably can be at times difficult, to say the least. I've never had this problem when reaching for my pizza slice.

—Jim Betts
Fort Myers, FL

MODEST MOUSE

In his August column, Pund seems to be worried about rodents eating parts of his car. When I attended college in Illinois in early 1943, the state decided to save metal for the war effort by making its license plates out of soybean plastic. It would have saved a lot of metal, but the farmers soon discovered that their cows were eating these

license plates, so they had to start making them from metal again.

—Neal O. Hammon
Shelbyville, KY

THE PEOPLE VS.

In Ezra Dyer's August column, he wrote, "I can't think of any unsavory celebrities who ever had anything to do with a big Bronco." Dude! Do the letters O and J ring any bells?

—Gunther Hanke
Huntington Beach, CA
Didn't get the joke—Ed.

I had to laugh while reading Dyer's column when I came to the line "I can't think of any unsavory celebrities who ever had anything to do with a big Bronco." Really? So O.J.'s infamous hours-long drive in a white

Bronco has passed from memory? I laughed and then winced. No doubt the inbox will quickly fill with other folks pointing out this blooper. Unsavory would be the least offensive term that I would use to describe a murderer.

—Eric Korbel
Lakeville, CT

Didn't get the joke—Ed.

Dyer, really? No unsavory celebrities having anything to do with a big Bronco? Can you spell O.J.?

—Kurt A. Stolpa
Waterford, OH

Didn't get the joke—Ed.

Regarding celebrity Ford Bronco owners, Dyer somehow blocked out the most famous celebrity associated with

MOUTHFEEL

While perusing the latest issue, my breath was taken away at the sight of this iconic vehicle staring back at me with a Lexus-like gaping grille ["700 Club," August 2018]. Why would Aston Martin do this to what is inarguably the most beautiful front end in the market? Just asking.

—Jim Kinney, *Grand Blanc, MI*



full-size Broncos when he neglected to mention O.J. Simpson. In the Bronco world, we pretty much call any post-1979 full-size Bronco an O.J. Bronco.

—Thom Cheney
Portland, OR

Didn't get the joke but was pretty nice about it—Ed.

Can't think of any unsavory celebrities who ever had anything to do with a big Bronco? Uh, O.J. Simpson? Big white Bronco, low-speed car chase through L.A.? Yeah . . . that one.

—Greg Funk
Melbourne, FL

Can't fake the funk and didn't get the joke—Ed.

Just one name for Dyer regarding skeezy celebrity big-Bronco owners: O.J. Simpson.

—G.R. Gries
Stayton, OR

Didn't get the joke—Ed.

I have always loved the humorous slant by the writers of *Car and Driver*. Dyer just climbed to the top of my list with his inability to recall any unsavory celebrities associated with big Broncos.

—Rick Connelly
Lexington, SC

Got the joke—Ed.

CLASS TIME

I don't know if you can help me, but I recently purchased a 2017 BMW 330i Sports Wagon with xDrive. I know there aren't a lot of them on the road so I contacted BMW and asked if they could

tell me the number of 2017 Sports Wagons they sold in the U.S. I was told, nicely, that they do not share that information.

—Louis D'Arcio
Valley Stream, NY

At a lavish steak dinner accompanied by a couple bottles of nice Bordeaux, BMW shared with us that it sold 2634 3-series Sports Wagons in the U.S. last year—Ed.

I have a question about Chevrolet. "Bolt" sounds mechanical but is electric. "Volt" sounds electric but is mechanical. What am I getting wrong?

—Mike Lampton
Berkeley, CA

Resistance is futile—Ed.

I am an avid *Car and Driver* reader and I think it would be interesting if you guys had interior car smell as a subcategory in the vehicle section for comparos (and maybe mention it in tests). The reason I request something this odd is because knowing how good or bad a car smells would definitely influence my decision to buy that car. Also, it would be cool to see the difference in vehicle smell before and after 40,000 miles of your awesome long-term tests.

—Logan Unger
San Jose, CA

There's a special scratch-and-sniff issue coming, provided we can work out an accurate facsimile of hot New York dumpster garbage—Ed. 🇺🇸

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Upfront



Reveal of the Month

THE THIRD DEGREE

BMW PROMISES THAT THE 3-SERIES IS DONE RESTING ON ITS LAURELS. *by Mike Duff*

■ **WHEN IT COMES TO SEDANS**, German auto executives love to talk about sportiness. Although they never specify what sport they are referring to—racquetball? buzkashi? quoits?—we know what they mean: that a car feels athletic, as a sports sedan should. It's a concept that BMW did much to create and popularize with the 3-series (and its progenitor, the 02-series), but it's an area in which the current 3 feels notably deficient. So although the new 3-series is bigger, lighter, and more technology-laden than its predecessor, BMW is crowing loudest about how much better it will be to drive.



▼ CHASSIS

Known internally as G20, this 3-series is based on the same Cluster Architecture (a.k.a. CLAR) that underpins BMW's larger longitudinal-engine models, with a structure that uses more aluminum and high-strength steel than the outgoing F30 generation. It is 3.3 inches longer but weighs less than before. Switching to aluminum for the front fenders and hood saved 33 pounds, with reductions elsewhere meaning the new 3-series will come in up to 120 pounds lighter than the equivalent version of the current car.

BMW is particularly proud of the 3's new position-sensitive passive dampers, which quell large suspension motions with an additional hydraulic element. These will be standard on all versions except those with the adaptive system, and they maintained exceptional discipline during our recent drive of a prototype in Germany.

▼ POWERTRAIN

While other markets will get a plethora of gasoline and diesel engines, the plan is to offer only three choices in the U.S. The four-cylinder 330i and the six-cylinder M340i will use evolutions of existing turbocharged powerplants. A plug-in-hybrid 330e will follow, but BMW is being coy about the particulars of that one.

The 330i gets a modest increase in output, with horsepower rising from 248 to 255 and torque increasing from 258 to 295 pound-feet. BMW estimates acceleration figures will be just a tick quicker than the outgoing 330i's, but we wouldn't be surprised if the improvement is bigger once we get the G20 on a test track. BMW hasn't yet released engine specs for the M340i, but company insiders say it will have the brawnier version of the turbocharged 3.0-liter inline-six, which will make its debut in the Z4; it should produce around 380 horsepower.

Rear-wheel drive will be standard, but all-wheel drive will be available with both the four and the six. In Europe, BMW will offer a six-speed manual in certain diesel 3-series, but the only



The B48 four-cylinder and B58 six-cylinder engines in the new 3 are members of BMW's modular engine family, which is based around 500-cc cylinders.

transmission offered in the U.S. will be an eight-speed auto. "Sadly, the take rate on manuals is declining and declining," product manager Stephan Horn tells us when we question this decision. "For this car, we calculate it will be less than 10 percent globally." But company executives have previously committed to offering a manual in the next M3, so start saving.

▼ DESIGN

Horses will remain unstartled by the exterior design of the new 3-series, which draws liberally from its larger siblings. The grille is wider and taller, and the headlights are bigger than before. LED lighting is standard, and adapted-for-the-U.S. laser high-beams are available. The side profile is nicely proportioned, and the front overhang is trimmer than the new Z4's.

"It was our main target to keep the overhang short," explains Marc Michael Markefka, lead exterior designer. "We had to negotiate hard with the engineers to keep that. It is two centimeters [0.8 inch] longer than the last car, but with the need to meet tougher crash regulations, that felt like a very good result."

Although brand purists will be pleased to see the Hofmeister kink in the rear quarter-window, the trademark shape gains an extra bend, and a separate piece of trim now stretches it into the sheet-metal aft of the door.

Markefka, clearly pleased that we noticed, says, "We wanted to stretch the glass graphic toward the rear, but we wanted to keep the door short to have comfortable access to the rear seats."

001

002





001
OF COURSE THIS EXAMPLE IS FITTED WITH THE OPTIONAL LASER HEADLIGHTS.

002
THE SHORT FRONT OVERHANG AND LONG HOOD GIVE THE NEW 3 THE LOOK OF A VEHICLE WITH 50/50 WEIGHT DISTRIBUTION.

003
WATCH FOR THE NEXT POINT OF PEDANTIC PRIDE AMONG BMW PURISTS TO BE GRIPING ABOUT THE HOFMEISTER KINK NO LONGER BEING SOLELY ON THE DOOR.



▼ INTERIOR

The cabin of the outgoing 3-series became outdated as soon as Mercedes launched the fourth-gen C-class in 2014 and positively anachronistic when the current Audi A4 followed in 2016. The main message on the new car might be its improved dynamics, but the interior has received a substantial update as well.

The entry-level version will have a 5.7-inch digital display in the gauge cluster as well as an 8.8-inch central touchscreen. Buyers of the 330i will be able to upgrade to a 12.3-inch digital instrument display and a 10.3-inch dashboard screen bundled with navigation—goodies that come standard on the M340i.

Interior space is similar to the outgoing model's, although BMW claims there is more shoulder room and elbowroom for front-seat occupants. Trunk capacity is unchanged but the aperture is wider. Acoustic glass and noise-insulating foam in the A-pillars will cut interior noise. Collision warning and automated emergency braking will be standard, with a variety of other driver-assist systems on the options list.

From the stitching on the seat cushions to the button finishes and dash trim, the interior design and materials are necessary and luxurious steps up from the last-generation 3-series.

▼ HOUSEKEEPING

We expect the new 330i to carry a base price of around \$35,000, which is close to the current version's entry point. The base price for six-cylinder cars won't move much, but it will creep past the \$50,000 threshold. Sales of the 330i and M340i start early next year, with the plug-in-hybrid 330e following in 2020. There's a remote possibility that a diesel-powered version will make it to our shores eventually, but we're told there is absolutely no chance that the station wagon will cross the Atlantic. But if BMW can restore the 3-series' sportiness, we'll take it in whatever body style we can get it.



COBALT IS NATURALLY OCCURRING BUT MUST BE EXTRACTED FROM OTHER MINERALS BEFORE IT CAN BE USED. TYPICALLY ASSOCIATED WITH A BLUE COLOR, COBALT CAN ALSO TURN MINERALS PINK, AS IN THIS PIECE OF CALCITE.

Unobtainium

MINERAL RITES

RARE-EARTH ELEMENTS, CONFLICT MINERALS, AND COBALT ARE CRUCIAL TO THE EV ECONOMY. *by Bengt Halvorson*

AN IMPENDING WAVE OF EVS from established luxury brands is about to crash ashore, and whether the vehicles are bringing Ludicrous-level performance, long driving ranges, and/or ultrafast charging capabilities, the irony isn't lost on us that the traits that will help give them broad appeal may involve ethically suspect supply chains. The majority of EV models use permanent-magnet motors, which are smaller and more efficient than induction motors, the common alternative. But meaningful increases in motor performance will demand stronger magnets, which in turn will require more of one controversial category of ingredient: rare-earth elements.

These elements—including the neodymium that's essential for modern permanent-magnet motors—are abundant in the Earth but difficult to produce, as they must be extracted from other minerals via labor-intensive refinement processes. More than 90 percent of the current production of rare earths takes place in China, with some of it coming from unsanctioned producers that don't follow safety protocols, environmental rules, or labor laws. China's government

has instituted new regulations to curb unlicensed production, but even licensed refiners have run afoul of the law. The government suspended operations at one state-owned firm in July after it was found to be contaminating nearby water sources.

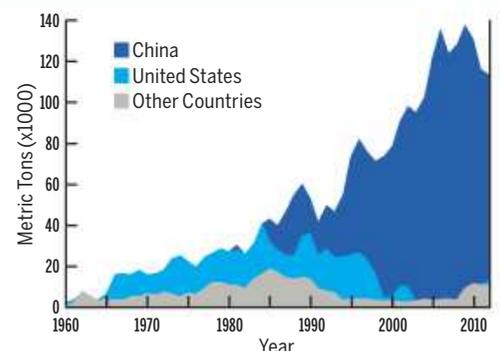
The output requirements for high-performance EVs will likely be borne from scaled-up power electronics containing tin, tantalum, tungsten, and gold. These so-called conflict minerals, along with cobalt, a crucial element in the fight for longer driving ranges, are often sourced from the Democratic Republic of Congo (DRC), a country whose mining industry is rife with human-rights violations. One UNICEF report estimates that 40,000 children are working in DRC mines, where they are often exposed to toxic dust and the tunnels cave in with disturbing frequency.

With these supply-chain concerns in mind, many companies are trying to reduce their dependence on rare-earth elements. Toyota has found a way to reduce the amount of neodymium in its electric-motor magnets (intended for use within 10 years) by around 20 percent by cutting it with other, less sought-after rare earths. In 2012, Nissan began fitting the Leaf with an updated motor that uses 40 percent less dysprosium, another rare-earth element. Tesla claims that the cobalt content of the energy-dense cells in its Model 3 battery is lower than it is in cells from rival suppliers, and its battery partner, Panasonic, is working to develop batteries that don't need cobalt at all.

The U.S. government is wading in, too. In May, the Department of the Interior published a list of 35 mineral commodities "considered critical to the economic and national security of the United States," including the rare-earth-elements group, conflict minerals, and cobalt. The list is the government's way of urging companies to limit their dependence on foreign sources for the minerals and to find more ways to effectively recycle them. And the reliability of raw-material sources will likely play a major role in determining which new technologies get the green light.

FOREIGN INVASION

The Mountain Pass mine in California once made the United States the world's main producer of rare-earth minerals, but it halted chemical processing in 1998 after a series of wastewater leaks, and its owner eventually filed for bankruptcy. The mine was purchased in 2017 by MP Mine Operations, a company based in—you guessed it—China.



SOURCE: U.S. GEOLOGICAL SURVEY



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that excites

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Nissan Altima[®]

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COMPRESSION SHORTS

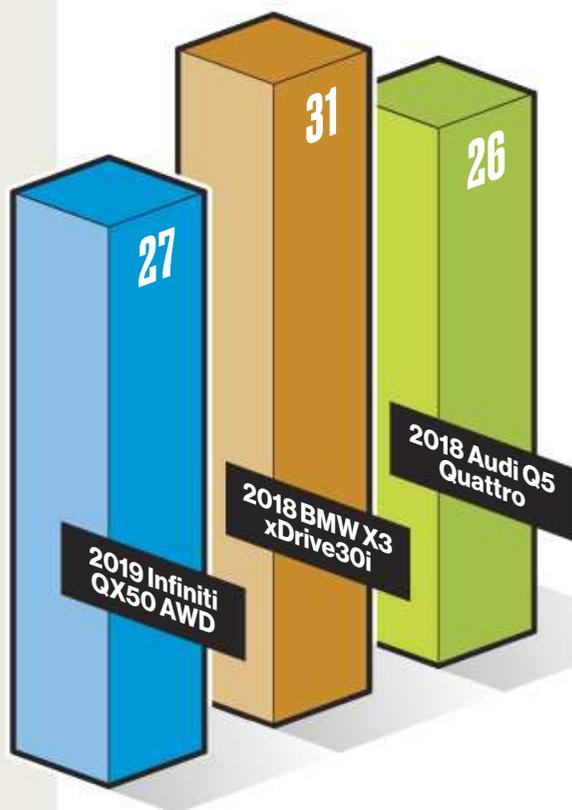
WHY DOESN'T NISSAN'S HOLY-GRAIL VC-T ENGINE ACHIEVE BETTER FUEL ECONOMY? by Dave VanderWerp



SHAPE SHIFTER
Depending on the demand for torque, the VC-T's compression ratio varies from 8.0:1 to 14.0:1.

THE QUEST TO PRODUCE an engine with a variable compression ratio, which would allow it to be optimized for fuel economy or torque depending on demand, has captivated engineers for nearly a century. Nissan has spent the past two decades bringing the first such engine into production via the force of sheer will—and some 300 patents—so we expected big things when this turbo four-cylinder finally materialized. Launched in the 2019 Infiniti QX50 [see Fleet Files, page 077], the variable-compression-ratio engine was off to a good start, improving on its V-6 predecessor.

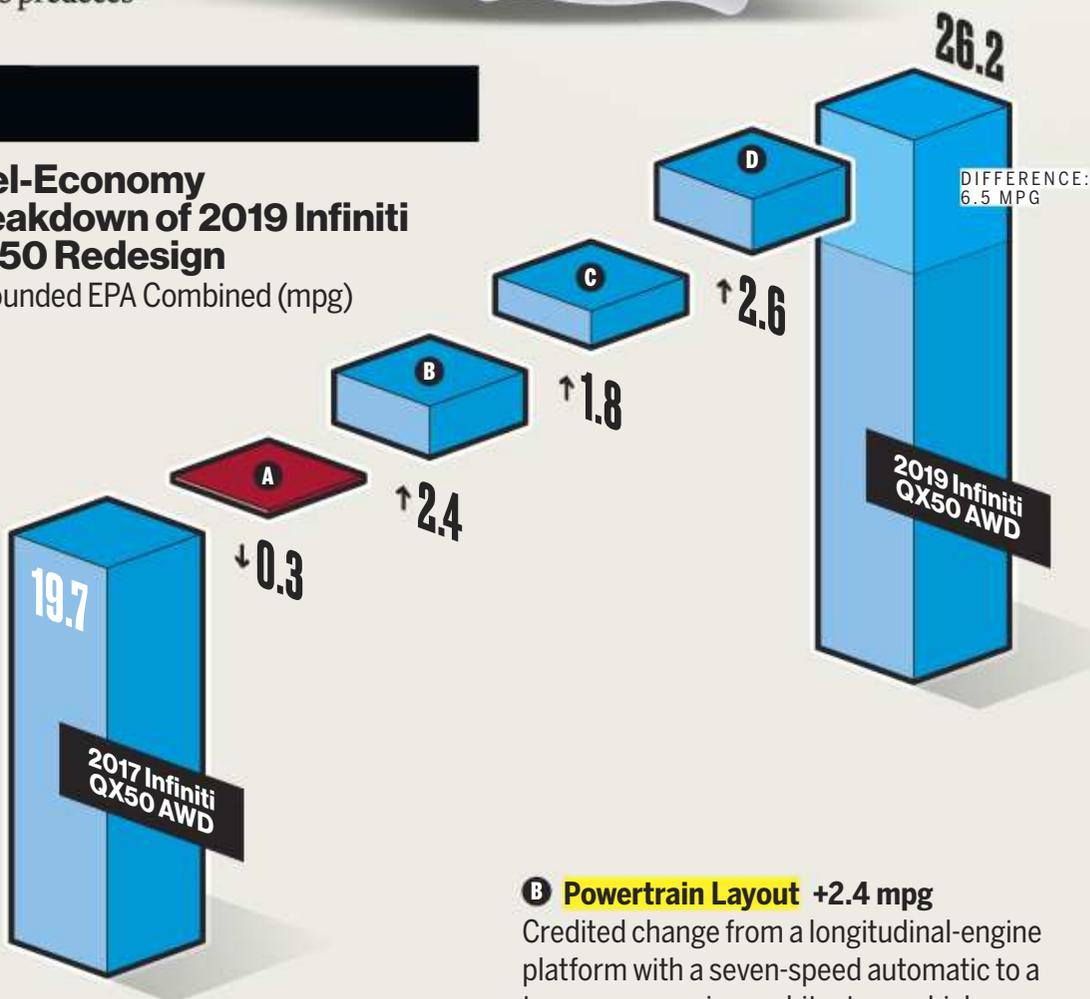
C/D Real-World 75-mph Highway Fuel Economy (mpg)



On our 200-mile highway loop, run at a steady 75 mph, the all-wheel-drive QX50 averaged 27 mpg, which is 1 mpg better than the Q5 but 3 mpg below its EPA highway rating and 4 behind the X3, which beat its own highway bogey by 2 mpg.

Fuel-Economy Breakdown of 2019 Infiniti QX50 Redesign

Unrounded EPA Combined (mpg)



Weight Class No change

Despite a claimed minor reduction in weight, the new QX50 remains in the same weight class for EPA-testing purposes, so there's no fuel-economy benefit.

A Aero Drag -0.3 mpg

Negative aerodynamic impact resulting from the new QX50's additional width and height, an estimated 9 percent increase in drag area.

B Powertrain Layout +2.4 mpg

Credited change from a longitudinal-engine platform with a seven-speed automatic to a transverse-engine architecture, which reduces driveline losses, and a CVT.

C Engine +1.8 mpg

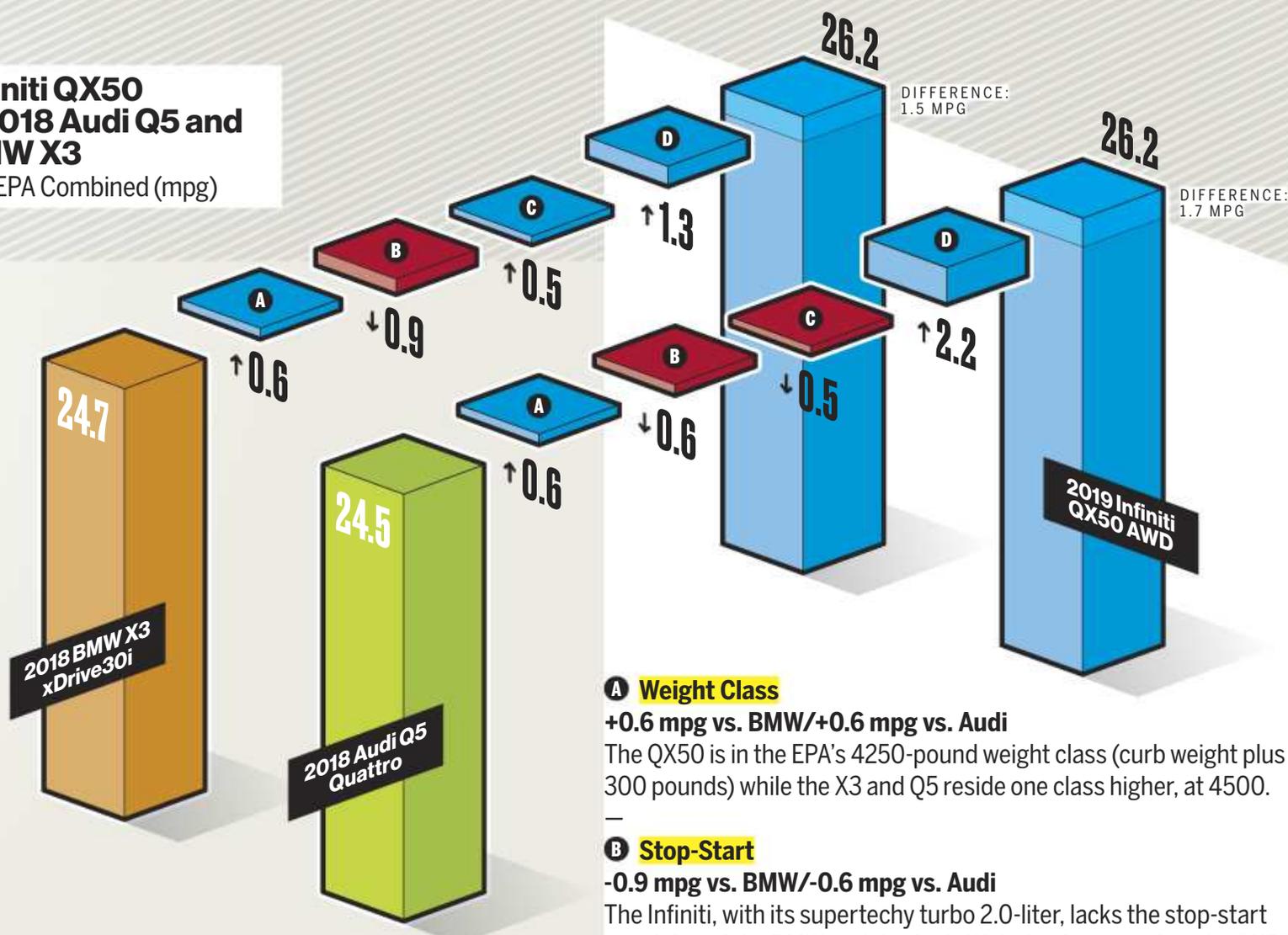
Estimated gain of switching from a naturally aspirated, port-injected 3.7-liter V-6 to a nonvariable-compression-ratio 2.0T four.

D Variable Compression Ratio +2.6 mpg

Estimated improvement from varying the 2.0T's compression ratio, 11 percent.

2019 Infiniti QX50 versus 2018 Audi Q5 and 2018 BMW X3

Unrounded EPA Combined (mpg)



sor by 6 mpg (30 percent) in its EPA combined rating when comparing all-wheel-drive models. But that still leaves Infiniti's compact crossover just a single EPA combined mpg ahead of its most efficient nonhybrid peers, the Audi Q5 and the BMW X3, neither of which uses such a complex engine concept. What gives?

Fuel-economy-modeling experts at Novation Analytics helped us uncover why the variable-compression four doesn't shame its more conventionally powered peers. Novation has a team of mostly ex-FCA engineers who have built incredibly detailed and quick-calculating fuel-economy-modeling software dubbed Energy. Fuel economy is, of course, about far more than a car's engine. It's the result of interactions between each part and subsystem of a vehicle and can be influenced by everything from aerodynamics to brake drag to rolling resistance. Novation's Energy tool can model any existing vehicle—or can create one from scratch—and can tweak details such as the engine's compression ratio, the tires' rolling resistance, and the car's frontal area. Applying those factors, Novation can virtually run the altered model through any EPA cycle or any other customized drive cycle (to replicate a real-world traffic pattern, for instance) in a matter of seconds. Not surprisingly, given this impressive capability, Novation counts most major automakers as clients.

The variable-compression-ratio engine is only part of the extensive overhaul to this latest QX50, which switched from a longitudinal-engine rear-wheel-drive architecture to a transverse front-drive setup, from a seven-speed automatic to a CVT, and

A Weight Class

+0.6 mpg vs. BMW/+0.6 mpg vs. Audi

The QX50 is in the EPA's 4250-pound weight class (curb weight plus 300 pounds) while the X3 and Q5 reside one class higher, at 4500.

B Stop-Start

-0.9 mpg vs. BMW/-0.6 mpg vs. Audi

The Infiniti, with its supertechy turbo 2.0-liter, lacks the stop-start capability of the BMW and the Audi. With this functionality, the QX50 could bump its EPA city and combined ratings by another mpg.

C Powertrain

+0.5 mpg vs. BMW/-0.5 mpg vs. Audi

The QX50's transverse-engine layout and CVT are benefits versus the X3's longitudinal engine and conventional eight-speed automatic, but the Q5's dual-clutch automatic and all-wheel-drive system that automatically disconnects the rear driveshaft are more efficient still.

D Variable Compression Ratio

+1.3 mpg vs. BMW/+2.2 mpg vs. Audi

The gain from the Infiniti's ability to vary its compression ratio.

GROWTH CHART

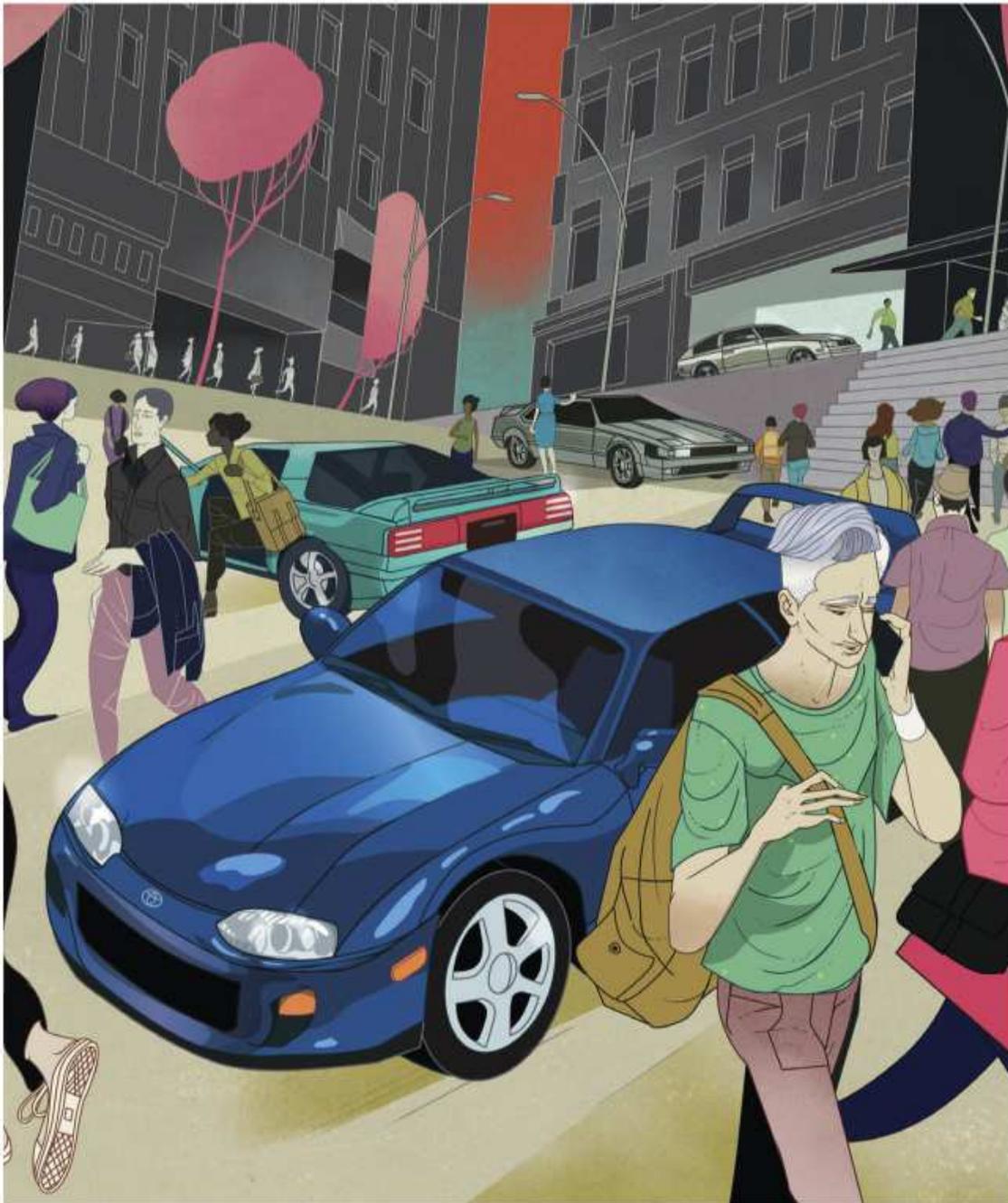
THE 2019 QX50 IS SHORTER IN LENGTH BUT TALLER AND WIDER THAN THE OUTGOING MODEL, TRADING WAGONOID LOOKS FOR SOMETHING MORE SUV-ISH.



from a naturally aspirated 3.7-liter V-6 to a turbocharged 2.0-liter inline-four. In the accompanying charts, we've used Energy to compare the relative efficiencies of the building blocks that make up the EPA combined estimates of the Q5, the X3, and the QX50 and have broken out the largest differences. One unexpected standout in the data: good old-fashioned rounding. To arrive at the integer values that are reported on the window stickers, both the Audi and the BMW round up to 25 mpg while the Infiniti rounds down to 26. The other main factor limiting the EPA rating of the Infiniti is the QX50's lack of stop-start functionality. This engine now powers uplevel versions of the new Nissan Altima [see "The Middle Man Would Like a Word," page 056], and against the turbocharged-2.0-liter-mid-size-sedan crowd, it will distance itself further—by 2 to 3 mpg—which may be more likely to earn potential buyers' notice.

THE TOYOTA SUPRA

A LEGEND EYES ITS COMEBACK. by Brett Berk



THE ORIGINAL SUPRA (code-named A40) was introduced to America in 1979 in order to imbue Toyota with enthusiast credibility. This was a challenge, given the marque's reputation as a producer of chintzy yet reliable econoboxes and a consumer base weaned on brutal domestic muscle.

Kevin Hunter is the president of Caltly, Toyota's Southern California research and design outpost, which styled the new Supra. He says the first-gen Supra aimed to be "a more sophisticated approach to the GT class" and promised owners more for their money. It was thus built around a fuel-injected straight-six engine on a stretched version of the rear-wheel-drive Celica platform and offered with options like cruise control and a sunroof.

Over three successive generations, the Supra retained its straight-six rear-wheel-drive concept but became a shifting outlet for Toyota's identity experiments. The A60,

introduced for the 1982 model year, grew edgier, with aggressive origami styling and crisp handling. Sold from 1986 to 1993, the A70 had morphed into more of a boulevardier, gaining as much as 500 pounds with luxury features and predicting the first-generation Lexus SC, released in 1991. Finally, the A80 of the '90s became a winged, bulbous near exotic with available sequential turbos, aluminum body panels and chassis bits, a sub-five-second zero-to-60-mph time, and a \$42,800 price tag (about \$75,000 in today's dollars). Famous for an incredibly overbuilt 3.0-liter straight-six code-named 2JZ-GTE, which could endure massive boost pressure, it became an avatar for a company focused on irrefutable dependability.

And then, in 1998, the Supra stopped coming to our shores, a victim of the Japanese economic implosion, adverse yen-to-dollar exchange rates, and a major shift in consumer desires. "Sports cars stopped being image cars," says Ben Hsu, owner of a 1980 Supra and editor of JapaneseNostalgicCar.com. "And SUVs started becoming cool."

Now that the SUV has devoured every market segment, and Toyota has staked its fortune on building the blandest, best-selling versions, timing seems inauspicious for a Supra revival. Toyota showrooms are mired in aging repeat buyers who purchase mainly for reliability. But without fresh blood, the brand may wither. Enlivenment is manifest. So a new Supra is coming, a collaboration with BMW, which has based its third-gen Z4 on the same chassis and Munich-bred straight-six (and four-cylinder). And Toyota is not just targeting young customers with the A90 Supra. It's seeking engagement. Chief engineer Tet-suya Tada is already on record encouraging enthusiasts to perform engine swaps

on the new car, dropping the 2JZ into a fresh body.

"If we want to compete better, our cars have to be more exciting," says Caltly's Hunter. "They were getting vanilla. Not only the styling but also the performance." That's not just talk. The company's recent efforts to instill the Camry with some athleticism point to a shift in the corporate mindset. But, as four generations of sports coupes have shown, Toyota is serious about reinventing itself when it reinvents the Supra.

10-SECOND CAR

The A80 Supra lodged itself into the consciousness of a generation of car geeks when a particularly gaudy example appeared in the first installment of the *Fast and Furious* franchise. Festooned with orange paint and green graphics and one of several stunt cars used in the movie and driven by Paul Walker, it sold at auction in 2015 for a cool \$185,000. How's that for appreciation?



PHOTO PROVIDED BY MECUM AUCTIONS

What owners say about V1...



★★★★★ Bill P., Phoenix, AZ

Where's the radar? An arrow lights up, pointing either Ahead, to the side, or Behind. And, amazingly, it's never wrong.



★★★★★ Arnie R., Atlanta, GA

So easy to operate, a box with one knob. No need to poke around at full-arm's reach for little buttons the size of rice grains.



★★★★★ Glenna R., Dallas, TX

Love the arrows! Where's the radar? They tell me every time. A detector without the arrows is like a car without headlights.



★★★★★ Chas S., Charlotte, NC

Situation Awareness you can trust. With the Radar Locator arrowing toward threats, and the Bogey Counter telling how many threats you face, V1 makes defense easy.



★★★★★ Cal L., Trenton, NJ

I've owned my V1 since 2001, and I've had it upgraded twice. I trust the arrows to point out every radar trap. When I know *where*, I know how to defend.



★★★★★ Ed H., Las Vegas, NV

How can anyone not be smitten by the Arrows? Radar ahead needs a different defense than radar behind. When I know where, I know what to do. When I put the threat behind me, the arrows confirm it. Without the arrows, you're guessing.



★★★★★ Rob R., Sacramento, CA

This is the slam dunk best radar detector. No databases to keep updating, or other "features" I'll never use. Instead V1 tells me the important stuff—the Bogey Counter tells you how many threats within range and the red arrows tell where they are.

Trust...V1 earns it one ambush at a time.



★★★★★ Harold B., Houston, TX

On my way home this afternoon I was following another detector user. I could see red blinking in his windshield as we went past the first radar. Thinking the danger was behind, Mr. Ordinary Detector User hit the gas.

Uh-Oh. V1's **Radar Locator** was showing two arrows, one pointing toward the trap now behind, and a second arrow ahead. The "2" on the **Bogey Counter** confirmed we were being double teamed.

Sure enough, Mr. O. D. User cruised into the second trap up the hill at 15 over and got himself a blue-light special.

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Ride Sharing

STOCK MIGHT RALLY

THE RALLY RD. SMARTPHONE APP LETS ENTHUSIASTS BUY AND SELL SHARES IN CLASSIC CARS. *by Benjamin Preston*

REMEMBER THE DAYS when you could scoop up a used Ferrari 330GT 2+2 for 30 grand? Neither do we. Today, even a low-end vintage Ferrari sells for hundreds of thousands. And the truly collectible cars—Ferrari 250GTs, prewar Alfas, Aston DB4 GT Zagatos—fetch millions. The average Joe, it seems, has no hope of getting into the higher levels of the game.

That's where Chris Bruno, one of the founders of Rally Rd., disagrees. Rally Rd. is a platform that gives aficionados who can't afford high-end cars the chance to own a stake in one. The business is regulated by the U.S. Securities and Exchange Commission, and FINRA-registered brokers oversee all transactions and vet the vehicles Rally Rd. purchases.

Here's how it works: The Rally Rd. team acquires a blue-chip (or not-so-blue-chip) classic car, securitizes it, and opens an initial offering of shares. The price per share has ranged from \$8 to \$200. Funding a car can take less than 10 minutes or up to three months, and Rally Rd. assumes the responsibility of storing and maintaining each car in its portfolio. After the initial offering, shares cannot be bought or sold for 90 days, after which users can buy or sell shares within the app through a registered broker. So far, Rally Rd. has conducted follow-up trading windows on three cars, each of which saw gains of 3 to 5 percent over the course of four to six months. At press time, Rally Rd. had sold all the shares in its initial offerings of a 1985 Ferrari Testarossa and an '83 Ferrari 512 BBi. Other cars in the lineup include a \$425,000 '55 Porsche 356 Speedster and a \$16,500 1990 Ford Mustang 7Up Edition.

As with pork bellies and frozen concentrated orange juice, a



The Market, a U.K.-based online platform and app, facilitates sales of entire vintage cars, not just shares. Users can find everything from a \$3000 Honda to a megabuck Aston Martin, but with curated offerings, professionally written listings, and optional storage and transportation assistance, it's more RM Sotheby's than eBay Motors.

car's value fluctuates over time. Bruno sees Rally Rd. as a way to diversify within a hobby whose assets often swing in and out of favor. "Most people can afford one collectible car—a Ferrari, for example. Then if the Ferrari market goes bad, they're screwed. This way, you can be spread across different genres." Rally Rd. leans on its network of dealers, auction houses, and private brokers to decide when the time is ripe for any given car to be sold. After the sale, the liquidated funds are distributed among the shareholders.

Brian Rabold, Hagerty's VP of valuation services, says that it takes an incredible amount of research to determine which cars—based on provenance and condition—are good investments. "Ultimately, there are probably better places to invest your money than buying shares of collector cars, but this could be a fun way to participate in something that might otherwise be prohibitively expensive."

It almost goes without saying that shareholders aren't allowed to drive the cars, so Rabold's idea of fun might differ from yours. Rally Rd. is working to set up a showroom in New York where investors can visit the cars they partially own. Video livestreams have also been discussed. Bruno and his team are all car guys, but they have cars they drive and cars they preserve. Investment cars, he says, are for looking, not for touching. That's fine for the Wall Street set, but if we had a Ferrari Testarossa, we'd be driving it.

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John Phillips // Last month, I concluded with a search-and-rescue expert wondering if he'd have to save me atop Montana's Beartooth Highway. As if I don't know what I'm doing.

First some facts: The Beartooth achieves 10,947 feet, which is

1000 feet above the tree line. It is 68.7 miles long and connects two locales you've never planned to visit: Red Lodge and Cooke City, Montana. Of course, Cooke City isn't a city. It's a raggedy block-long strip of '50s *Psycho* cabins, motels, and neon-illuminated saloons, one with a '70s Ford Maverick parked permanently on its porch.

The Beartooth was a Depression-era project completed in 1936, signed off by Hoover—and not the one who wore dresses. On average, 150 workers called gippos worked on the road daily. One name proposed for the road was the Dorris Stalker Highway, which was perfect but they didn't know it. The gents who oversaw its construction were J.C.F. "Doc" Siegfriedt, O.H.P. Shelley, J. McNutt, and G. Pyle. Pardon me, but that is the greatest-ever name for a law firm, particularly since the partners were sometimes serenaded by Art Lumley's Melodians. Not something you need to know.

The road was originally gravel and 14 feet wide. That's 84 inches per lane, suggesting some Chitwoodish two-wheel daredevilment, and the original maximum projected speeds were 20 to 30 mph. Until guardrails were installed, drivers were so terrified of the drop-offs that they often steered into the oncoming lane for emotional comfort. No end of body damage, cars and humans alike.

I've ached to drive the Beartooth since 1995, when I drove Charles Kuralt's CBS motorhome to its enshrinement in the Henry Ford Museum. Kuralt had just departed Montana—leaving behind a secret, long-term mistress, a fun fact for Charles but not his wife—and he told me:



"The Beartooth beats any drive in America. If it's open."

A weekend blizzard in 1947 stranded nearly 70 Beartooth tourists, some in 15-foot drifts. Three required hospitalization and three Park Service employees were buried in what turned out to be their tombs. Mind you, that wouldn't happen to cautious me. I'd waited until June 15, the ides of warmth, when *Car and Driver* entrusted me with a 365-hp rear-drive Genesis G90. I know. Feel free to hum a bar of "Danny Boy."

As I departed Cooke City, the temp was 50 degrees, though falling a degree each mile out of town. I mentioned it to my wife, right before snow began pelting in flakes the size of Post-it Notes. The G90's tail squirmed and juiced across the center-

line. I glanced at Julie, but she was delving into a packet of pink Nautzene just as we passed a seven-foot wall of snow upon which someone had spray-painted "Butte Butt Rats." The G90's proximity sensors went berserk, and traction warnings lit up the IP, but what would be the point of looking at them? Julie's face resembled Mark Zuckerberg's during his congressional testimony. I tried to lighten the mood, mentioning, "American beauty on the left, natural splendor on the right," but in truth there was no view but of snow and more snow and inestimable whiteness.

That's when I noticed that the oncoming lane had vanished under who knows how much snow and who didn't know. If any other car was negotiating the mountain, we'd be sharing the same blurry ruts—yup, back to the original 84 inches of width—and any three-point turn would put the G90's arse into terror incognita, and that is not a typo. Sure enough, as I attempted a U-turn, the gummed-up G90 foundered. Instantly. Then descended the mother, father, and second cousins of all whiteouts. I had to open both side windows to see anything abeam, and the item right then abeam was a yellow snowplow the size of Martinique, a destination I was coincidentally conjuring. The plow driver got out and ran—ran, I say—to my window. "Go back," he implored, wagging a gloved index finger. "We just closed the highway. God." I agreed that God was somewhere nearby. Within 100 feet, maybe. Still, I've never been so grateful to any man since Larry Gartner tutored me for my SATs. I put the G90 in reverse to gather speed traveling backward down the mountain, then whipped a 180-degree handbrake turn without a handbrake. I wish someone could have seen it. Then I popped a Nautzene, too.

I followed in the plow's tracks. Even so, the G90's nose became its own plow, randomly lifting the front tires. To this day, I have no idea how much of the Beartooth Highway I covered. If deep space were white instead of black, that's where I drove. We were the last two people on the mountain.

Why do I keep driving into these arctic cataclysms? Every goddamn year. Aldous Huxley said, "That men do not learn very much from the lessons of history is the most important of all the lessons that history has to teach." So I assume the man possessed winter tires. But who would name his kid Aldous? 🇺🇸



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Daniel Pund // Once, many years ago, I requested of a hairstylist that she make my hair look like Kevin Bacon's in the then-popular movie *Footloose*. This would have been the first time I went to a salon instead of Guy's Barber Shop, the hyper-regular, no-ap-

pointment-necessary, four-chair joint where all my previous trims had taken place. To satisfy '80s regulations, on the salon's windowless cinder-block wall, the proprietors had painted a Patrick Nagel-like mural of the face of a starkly white woman with absurdly red lips. I considered backing out. But this was important. This was to be the start of a whole new me, one that would make the other kids forget that I once wore homemade plaid pants. That little elementary-school kid had a conventionally parted and combed hairstyle. In its studied dishevelment, this new Bacon hair would make clear that the middle-school version of me had a roguish, devil-may-care attitude. Maybe I was slightly dangerous, a champion for fun and freedom in a world full of stodgy, repressive adults. Possibly I would engage in a game of tractor chicken. I mean, the kids gotta cut loose.

This ruse lasted for all of about a week before I was forced to admit to myself that I now merely looked sillier than I had before. The amount of time it took me every morning to fail at replicating what the hairstylist had done was more than I was prepared to invest. The other kids just thought I'd lost my hairbrush. I did not, as my friend Darryl did, always have a comb peeking out of my back pocket. Darryl was so committed to the proper feathering of his hair that in the summer when wearing shorts with no pockets, he would tuck his comb into his right knee sock.

The point is, I feel you, Honda. I know what you're going through. You're going to be fine. People like you. And, okay, I'm sorry. I didn't really mean to ridicule the Pilot for looking too much like a minivan.



Well, I did, but I didn't think you'd be so down about it. It's just that, well, this current generation, introduced for 2016, looks kinda like a minivan. You know, like the Odyssey, the minivan on which every generation of the Pilot has been based. But, like, everyone else was saying it, too, man.

How do I know it stung Honda? Well, first, because the whole point of the three-row family vehicle that's not a minivan is that it's not a minivan, even when it shares a minivan's underpinnings. Three-row crossovers are a game of masquerade, one that many full-line carmakers feel compelled to play. The only truly unforgivable thing is to pull off someone's sparkly mask and reveal the practical, dowdy person underneath. It's silly, of course. We should all be so honest with ourselves as to

acknowledge our minivan nature. But for many, that's like trying on a shirt, asking your wife whether it makes you look fat, and then only buying it if she says, "Oh, hell yeah, it does," followed by pig snorts.

The second reason I know the minivan criticism stung was that when it came time for the Pilot's mid-cycle refresh, for the 2019 model, much of the focus was on making the exterior look more rugged, "Ready for Family Adventure." The Odyssey is apparently ready only for family languor. The company is stuck with the Pilot's big, soft body until a full redesign in a few years. But it could replace the laid-back front grille with a piece that the company believes looks tougher. Portions of the front and rear bumper covers are now painted a silvery color to suggest the Pilot has skid plates. Ridiculous, sure. But is it more ridiculous than family sedans wearing rear bumper covers molded to look like aerodynamic diffusers? And if the restyle is unconvincing, at least it doesn't need to be redone each morning.

The third indication that Honda was sore about the minivan comparison was when a company representative said to me, "That minivan thing really kinda stung."

But we realize what thin ice we're currently stomping across in ridiculing the company for trying to make its SUV look tougher after ridiculing it for making it look too soft. And the buying public, the opinions of whom are most important to Honda, seems okay with the Pilot. The current model has, on average, sold better than the Pilot that it replaced, never dipping below 120,000 units for a calendar year. And its immediate predecessor, on sale model years 2009 through 2015, was as boxy and upright and SUV-like as a Pilot has ever been. It was also, on average, the worst-selling of the three generations. Okay, maybe that had something to do with the front grille that has been likened to a USB port. But still.

Maybe—now, just hear me out on this one—maybe shoppers looked past the second gen's boxy visage and noticed that it was slower and less powerful than its competitors and that its interior was a cheap plastic box filled with engine and road noise. Maybe, in other words, the group mind is less shallow than mine or Honda's. Or than that of any rotten individual who might ridicule a promising young man wearing tragic pants.

By the way, have you seen that Subaru Ascent? It looks like a station wagon! 🇺🇸



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Ezra Dyer // My older kid is only eight, but I'm already thinking about what he's going to drive. And so is he. He's expressed interest in "something with a V-8," but I'm inclined to disallow that based on what my friends and I did with V-8s when we were 16.

My friend Josh had a 1975 Chevy Nova with the 4.3-liter V-8, and you'd be surprised how much trouble you can get in with 110 horsepower. Although I guess cylinder count isn't a controlling factor in teenage mayhem, given that my winter ride was a slant-six Dodge Ram D150 that required emergency frame welding after I inadvertently invented rock bouncing. Nowadays they do it with tube-frame buggies, which is probably better.

I'm of two minds when it comes to kids and their first cars. On the one hand, they should have crappy cars because they're probably going to screw them up and who do these brats think they are? Trying to sustain 45 mph uphill in a Dodge Omni builds character.

The other school of thought is that since your kids will likely (though not always!) be the most dangerous drivers in your house, they should have the newest and safest car in your stable. In other words, I can drive my Bronco, which has no airbag and a steering rack made of pulleys and yarn. And my kids should get a new S-class, which probably has a system called Floatronic that automatically inflates pontoons and shoots emergency flares when you veer off into the Intracoastal Waterway. But they won't, because who do they think they are?

I guess somewhere in between lies the eventual answer. But I'm leaning toward the newer-car scenario, financially painful as it is, because cars are constantly getting safer. For just one example, the 2015 Mazda CX-9 got a Poor rating on the Insurance Institute for Highway Safety's small-overlap frontal test. The redesigned model scored Good across the board in



crashworthiness. I saw the old one at IIHS headquarters, and it wasn't pretty. I also watched a Honda Pilot undergo that test, and the dummies looked so unscathed, they could've climbed out and immediately started yelling at the crash barrier. *What the hell was that all about, buddy?*

New cars, besides having structural advantages, tend to have the latest electronic helpers—automated emergency braking [see “Brake Check,” page 050], lane keeping, pedestrian detection. They also have the narc factor going for them in that just about everybody has a way to turn your new car into a huge bummer. GM's Teen Driver parental-control system, for instance, includes a speed limiter and an audio-volume limit that I'd set to be extra aggressive if it detects Post Malone. The

system won't let you turn off traction control. (My teenage self would be familiar with that aspect, at least, since most cars in the school parking lot had a traction-control system called “no power.”) Teen Driver even generates a report card that shows how many times the kid went wide-open throttle. I guess it's like, if you don't see at least 10 of those per trip, then your kid is pretty lame?

My niece is 16, soon to get her license, and has been petitioning me to put in a good word with her parents about the Jeep Wrangler. “It's safe, right?” she says, like she cares. I suppose a new Wrangler has reasonable safety gear for something that is basically a dune buggy, but on the other hand, who does she think she is? Why, she should drive a Plymouth Reliant until she knows the value of a dollar, and by Jiminy, it'll break down all the time and smell like rodents, as a first car should. I feel like she could use something with automated emergency braking, though. Just a hunch.

To survey what the kids are actually driving these days, I fired up a Mustang Bullitt that I was testing and headed over to the local high-school parking lot. Okay, I only thought about doing that. After about 10 seconds, I realized that cruising around the school parking lot in a muscle car would probably make me look like a much creepier Wooderson from *Dazed and Confused*. You know what Melba Toast is packin'? A restraining order.

But eventually my kid had a science fair in the high-school gym, so I was over there anyway. And there weren't even any cars at all because these days a kid's first car is Snapchat and everyone just stays in their room social mediating instead of drinking beer in the woods, according to numerous stories I've read profiling representative American kids of the Upper West Side.

In fact, there were some sick lifted XJ Cherokees. And a couple of Miatas, one of which had a roll bar under its hardtop. Then there were a bunch of indifferent sedans and a smattering of uncreative rich-kid rides, a.k.a. BMW 3-series. Tragically modified Hondas were well represented. It was an updated version of my '90s school parking lot, with the K-cars replaced by Chevy Cobalts and the Cherokees replaced by more Cherokees. The scene was encouraging. You don't drive a Miata with a roll bar unless you care about driving.

I mean, my kids can't wait to drive. I know that. But it's nice to see that they're not alone. 🇺🇸

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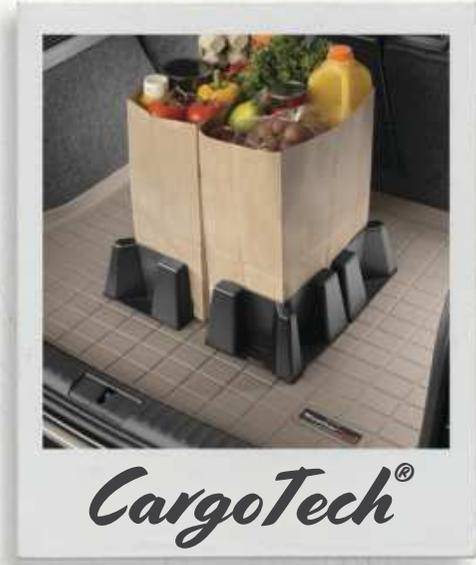
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APPALACHIAN OUTLAWS





Into Kentucky with a trio of troublemakers
to determine—oh, hell, we’re just doing this
because it’s fun. by Jared Gall

photography by Anton Watts

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0–60 mph: 3.4 sec

Like all good mountain roads, the byways squirming through the Appalachian foothills southeast of Richmond, Kentucky, look as if they were laid out by someone trying to scribble over something else. They barrel helter-skelter across the region's topography, following meandering rivers and tap-dancing along ridgelines. They thread their way past the occasional derelict car, the sort a goat would be proud to stand atop, but otherwise blissfully few domiciles. They are, in other words, the perfect place to put three 500-hp sports cars to the test.

We were not surprised by how much we liked the new Aston Martin Vantage at first contact. We liked the last V-8-powered one so much that we ranked it ahead of a Porsche 911 in its first comparison test ["Working Exotics," March 2006]. But then Aston let it wither on the vine, then let the vine wither, then, when the whole vineyard was nothing but memories of dust, the Brits bolted a dogleg seven-speed manual behind a 565-hp V-12 and charged more than \$200,000 for it.





	2019 ASTON MARTIN VANTAGE	2018 MERCEDES-AMG GT C	2018 PORSCHE 911 GT3
PRICE AS TESTED	\$186,806	\$167,765	\$151,200
BASE PRICE	\$153,081	\$146,995	\$146,350
DIMENSIONS			
LENGTH	175.8 in	179.0 in	179.6 in
WIDTH	76.5 in	79.0 in	72.9 in
HEIGHT	50.1 in	50.7 in	50.0 in
WHEELBASE	106.5 in	103.5 in	96.7 in
FRONT TRACK	65.6 in	66.1 in	61.1 in
REAR TRACK	64.8 in	66.1 in	61.2 in
INTERIOR VOLUME	47 cu ft	55 cu ft*	47 cu ft
CARGO	10 cu ft	10 cu ft	14 cu ft
POWERTRAIN			
ENGINE	twin-turbocharged DOHC 32-valve V-8 243 cu in (3982 cc) 503 @ 6000	twin-turbocharged DOHC 32-valve V-8 243 cu in (3982 cc) 550 @ 6250	DOHC 24-valve flat-6 244 cu in (3996 cc) 500 @ 8250
POWER HP @ RPM		550 @ 6250	500 @ 8250
TORQUE LB-FT @ RPM	505 @ 2000	502 @ 1900	339 @ 6000
REDLINE/FUEL CUTOFF	7000/7000 rpm	7000/7000 rpm	9000/9000 rpm
LB PER HP	7.4	6.8	6.6
DRIVELINE			
TRANSMISSION	8-speed automatic	7-speed dual-clutch automatic	6-speed manual
DRIVEN WHEELS	rear	rear	rear
GEAR RATIO:1/MPH PER 1000 RPM/ MAX MPH	① 4.71/6.1/43 ② 3.14/9.1/64 ③ 2.11/13.5/95 ④ 1.67/17.1/120 ⑤ 1.29/22.1/155 ⑥ 1.00/28.5/195 ⑦ 0.84/34.0/195 ⑧ 0.67/42.6/180	① 3.08/6.6/46 ② 2.19/9.2/64 ③ 1.63/12.4/87 ④ 1.29/15.7/110 ⑤ 1.03/19.7/138 ⑥ 0.84/24.1/169 ⑦ 0.69/29.3/196	① 3.75/5.6/50 ② 2.38/8.8/79 ③ 1.72/12.1/109 ④ 1.34/15.6/140 ⑤ 1.08/19.3/174 ⑥ 0.88/23.7/196
FINAL-DRIVE RATIO:1	2.93, limited-slip differential	3.88, limited-slip differential	3.76, limited-slip differential
CHASSIS			
SUSPENSION	F: control arms, coil springs, anti-roll bar R: multilink, coil springs, anti-roll bar	F: control arms, coil springs, anti-roll bar R: control arms, coil springs, anti-roll bar	F: struts, coil springs, anti-roll bar R: multilink, coil springs, anti-roll bar
BRAKES	F: 16.1-inch vented, cross-drilled ceramic disc R: 14.2-inch vented, cross-drilled ceramic disc	F: 15.8-inch vented, cross-drilled ceramic disc R: 14.2-inch vented, cross-drilled ceramic disc	F: 15.0-inch vented, cross-drilled disc R: 15.0-inch vented, cross-drilled disc
STABILITY CONTROL	fully defeatable, competition mode, launch control	fully defeatable, competition mode, launch control	partially and fully defeatable
TIRES	Pirelli P Zero PZ4 F: 255/40ZR-20 (101Y) R: 295/35ZR-20 (105Y)	Michelin Pilot Super Sport F: 265/35ZR-19 (98Y) R: 305/30ZR-20 (103Y)	Michelin Pilot Sport Cup 2 F: 245/35ZR-20 (95Y) R: 305/30ZR-20 (103Y)

CAR AND DRIVER TEST RESULTS

ACCELERATION			
0-30 MPH	1.5 sec	1.5 sec	1.4 sec
0-60 MPH	3.4 sec	3.4 sec	3.6 sec
0-100 MPH	7.6 sec	7.2 sec	8.0 sec
0-160 MPH	24.2 sec	19.4 sec	23.6 sec
1/4-MILE @ MPH	11.6 sec @ 123	11.4 sec @ 128	11.8 sec @ 122
ROLLING START, 5-60 MPH	4.0 sec	3.9 sec	4.6 sec
TOP GEAR, 30-50 MPH	2.6 sec	2.5 sec	6.8 sec
TOP GEAR, 50-70 MPH	2.9 sec	2.7 sec	6.4 sec
TOP SPEED	195 mph (gov ltd, mfr's claim)	196 mph (gov ltd, mfr's claim)	196 mph (drag ltd, mfr's claim)
CHASSIS			
BRAKING, 70-0 MPH	148 ft	148 ft	144 ft
ROADHOLDING, 300-FT-DIA SKIDPAD	0.99 g	1.05 g	1.10 g
610-FT SLALOM	42.6 mph	44.4 mph	45.2 mph
WEIGHT			
CURB	3726 lb	3743 lb	3303 lb
%FRONT/%REAR	49.0/51.0	47.0/53.0	40.1/59.9
CG HEIGHT	18.5 in	18.0 in	18.0 in
FUEL			
TANK	19.3 gal	19.8 gal	23.7 gal
RATING	93 octane	91 octane	93 octane
EPA COMBINED/CITY/HWY	21/18/25 mpg	17/15/20 mpg	17/14/21 mpg
C/D 800-MILE TRIP	15 mpg	14 mpg	16 mpg
SOUND LEVEL			
IDLE	57 dBA	58 dBA	59 dBA
FULL THROTTLE	87 dBA	93 dBA	95 dBA
70-MPH CRUISE	77 dBA	76 dBA	79 dBA

*C/D est.



except this one has only six pistons breathing atmospheric pressure, laid flat, and spinning to 9000 rpm. Porsche's PDK dual-clutch transmission would have been the more congruous choice, but any opportunity to pull a Porsche stick is one worth taking. Opting for a manual in the GT3 also unlocks the new-for-2018 Touring package, which deletes the GT3's rear wing at no additional cost. It retains the aggressive front fascia, double-barrel exhaust, and center-lock wheels, but it still blends stealth and speed in equal measure. A prudent list of extras also means the GT3 has the lowest price in the test, at \$151,200.

There are a couple of other base runners in the \$150,000, 500-hp ballpark. Acura's NSX is getting a mild refresh for 2019, but the new one wasn't available yet.

A 540-hp Audi R8 V10 RWS (for Rear Wheel Series) would have been a delightful way to even the teams between rpm and psi, but Audi wouldn't loan us one. Boo-hoo.

After returning from Kentucky, we steered west, to Ginger-Man Raceway in South Haven, Michigan, for an open track night. We didn't get a chance to time laps, but it was an illuminating frolic nonetheless. Here's how it all shook out.

This, then, is a refreshing change of pace. The Vantage is all-new for 2019, riding on a bonded-aluminum structure that relies more on stamped panels than the blocky extrusions that formed the VH architecture of the past for a more space-efficient design. (Though there's no glove-box.) Its old naturally aspirated engine lineup woefully outdated in the age of turbocharging, wee independent Aston Martin took the easy—and smart—way out and bought a 503-hp twin-turbo 4.0-liter V-8 from Mercedes-Benz. Its 505 pound-feet of torque constitutes a 46 percent increase from the old V-8 Vantages. The car starts at \$153,081, but this one's options bill carries it to \$186,086.

Context for this Aston starts with its heart donor. Mercedes plugs the 4.0-liter into many of its vehicles, including the Mercedes-AMG GT, which it offers in four different strengths. The GT grouping is tight, spanning just 108 horsepower and some \$45,000 in base price. The closest analogue to the Vantage is the third step, the GT C, which has a 47-hp advantage on the Aston but is \$6086 cheaper to start. With a healthy option load of its own, this GT C lands at \$167,765. Where the Aston routes its torque to a rear-mounted conventional ZF eight-speed automatic, the AMG's goes to a seven-speed dual-clutch, also bolted to the rear axle.

It would be unfair to say that Porsche is champing at the bit for a rematch, since after that first meeting in 2006, 911s dispatched Vantages in two subsequent comparison tests. But if you're looking at \$150,000 sports cars with 500 horsepower—really, if you're looking at any price between \$90,000 and \$300,000 and any output between 370 and 700 horsepower—there's a 911 to suit your needs. In this case, it's a GT3, which also uses a 4.0-liter engine to make 500 horsepower,

The Aston's highlighter paint makes lane markers look drab by comparison. And its fluorescence distracts the eye from the Vantage's beauty.

3. Aston Martin Vantage

We were barely 10 miles from the office when it happened for the first time. Another driver slowly rolled by, one eye on the road and one on his phone screen, shooting video as he passed. This happened so many times during the course of our driving week that we stopped counting. Not a gas stop or photo break passed with-





out making new friends, and nobody's first question was about the Mercedes or the Porsche. We'll get to the Aston's personality in a minute, but let's not pretend that the first thing everybody notices isn't this car's looks.

Watching the Vantage in your rearview mirror, you can't shake the feeling you're being tailgated by Aston Martin's \$2 million-plus track-only Vulcan. It's got the same gaping maw, predatory squint to the headlights, and broad clamshell hood. And the view only gets better as you move around to the back. The taper of the Vantage's greenhouse makes every other car on the road look like a Winnebago, and the wide hips and outrageous diffuser make it a delight to follow, too. Bright colors like the Lime Essence on this car mute some of the details across that hood, but paired with the naked carbon-fiber diffuser (\$10,700, inclusive of the front splitter and

The tragic nubbins flanking the rear license plate (which look like they came off a 1974 Porsche 914) satisfy U.S.-only safety regulations.

side sills), they emphasize just how little bodywork there is aft of the rear wheels. Aston design chief Marek Reichman deserves to be knighted for this.

But even though it's the most expensive car here, the build quality doesn't feel up to the level of the design. Other drivers at the track night commented on the sizable panel gaps around the doors, and the mesh around the \$1595 quad exhaust outlets appeared either to be melting or to have been hacked through with a spork. And inside, some of the stitching does a bit of a drunken wander over the panels it holds together. The car arrived at our office with an intermittent check-engine light that came on when we took it easy and went away with a good thrashing—though we find that deeply endearing.

Because thrash it we did. The numbers show that the AMG is the straight-line champ and the Porsche is the handling master,

Aston Martin Vantage [+] Movie-star handsome, the mischievous streak of a Hollywood bad boy. **[-]** Questionable build quality, never completely relaxes, fun but slow. **[=]** A very expensive plaything that is in some ways a bit too toylike.





but they don't tell you what we suspected after our Appalachian journey and confirmed at GingerMan: The Aston is King Hooligan. It's that friend who only makes bad decisions and keeps getting away with them. Even with the longest wheelbase in the test, it feels as if it's pivoting around a single contact patch right in the middle of the car. Like the Porsche, it readily rotates under braking, but unlike the Porsche, it doesn't settle with throttle. The long pedal just freezes the slip angle and then allows the driver to fine-tune it like a Formula Drift driver, the progressive breakaway behavior making child's play out of high-risk tomfoolery. High-dollar, too; we can still smell the smoldering Pirellis. It's not the fastest way around a track—or through the slalom, you'll note—but it's riotous fun.

But that fun comes at a cost, both financial and cognitive. The Aston demands a focus the others don't, and drivers who

The GT C looks like a modern version of the '50s 300SL Gullwing with a bobbed tail. Classic Euro-coupe proportions are still powerfully alluring.

aren't looking for the Vantage's particular brand of thrills can tire of it. If you want to go even faster, relax a bit while doing so, or do it for less money, read on.

2. Mercedes-AMG GT C

From the driver's seat of the AMG GT C, with that hood stretching out in front, you very much feel as if you're driving from the trunk. The AMG is 3.2 inches longer than the Aston, and you get the sense that's all between the windshield and the grille.

Actually, pop the hoods and you can see that the Mercedes does have a few extra inches between its front axle and the engine, which helps explain how this pyrotechnic Pinocchio manages to carry just 47 percent of its 3743 pounds over the front wheels. That, combined with the most rubber in the test—265s up front, 305s out back—grants the GT stupefying stability. It boasts an

Mercedes-AMG GT C [+] Jewelry-box interior, effortless straight-line speed, unflappable stability, IMSA soundtrack. [-] Snug interior, inevitable bystander disappointment when the doors don't open upward. [=] Going fast never looked so easy or — until the Vantage came along — so good.



almost supernatural ability to put down power on corner exit. Even when we tried to upset it with early and ham-fisted (ham-footed?) throttle applications, the AMG stayed planted, powering out of turns as if it had all-wheel drive. The prominent three-pointed star in the grille, this car's demure color combination, and the existence of a GT R above the C in the lineup might have you expecting the GT C to be something of a gentleman, but don't be fooled: A 1.05 on the skidpad will dent a dainty gent. You'll want to be sure to set the seat's adjustable bolsters to maximum support; the car's enormous grip meant one of us left GingerMan with a sore back because he hadn't.

And what sort of gentleman can drag-race Vipers with impunity? As horsepower gets increasingly commoditized, we're rapidly becoming desensitized to straight-line acceleration. But consider that the GT C will outgun Dodge's paragon of excess power and compromise in the quarter-mile. The Aston hangs with the Mercedes at first, but so much greater is the AMG's pull at high speeds that we'd find ourselves with the Vantage floored, trying to push through another kickdown switch. And in spite of its turbochargers—oh, the

GT C's sound. Fa la la la la. The guttural barrage is right off the main straight at Watkins Glen, Road Atlanta, or any other stop on the IMSA calendar. As we rotated through the cars on our drive, all our jurors mentioned the sound in every single one of their logbook entries. Noted, fellas.

Whereas the Aston is a wild and exotic-looking thing, there's a timeless beauty to the AMG. The more you look at it—particularly in a shade you've seen on a 300SL—the more you see the homage to that car in the roofline and the way the C-pillars slope down into the stubby trunk.

We loved the color choices and material mix inside the AMG but found it to have the most cramped interior. Never mind the numbers, which figure this as the largest cabin; the GT C's space is wider than is useful and shorter than is comfortable. Oddly, the C is the only AMG GT on which a sunroof is standard equipment. Taller drivers will struggle to tuck in below the roof without jam-



The GT C's sumptuous cabin is at odds with its surprisingly flinty ride quality. The twin-turbo 4.0-liter V-8 sounds so good. So, so, so good.

ming their knees into the dash. And the Mercedes suffers bumps worse than the others, with more harshness in body jolt and sound. All of us ranked the GT C as our last choice for highway slogs.

Not as engaging as the Aston Martin, the AMG is nonetheless more impressive, a no-drama speed sled. But the enjoyment is less experiential and more intellectual, making you marvel at what's happening rather than revel in the fun of it. The Aston Martin is all liveliness, the Mercedes all control. The Porsche is both.

1. Porsche 911 GT3

Sometimes, even on a racetrack, it's not all about speed. Sometimes it's about the love of the game, and few elements of any car today will make you fall in love faster or harder than the GT3's six-speed manual. Depress the clutch, feeling the point where the disc fully separates. Notch that naturally weighted shifter into reverse. Feel the clutch grab, then feather its engagement as you back out of your parking spot. You've moved a single car length and already you're certain that this is the perfect manual transmission. If not for its \$150,000 price tag, this would be the ideal tool for teaching teens how to drive a manual.

Or not, because adolescent brains are worse at impulse control than fully developed ones. Aston's chassis might whisper





evil nothings in your ear, but the Porsche's 9000-rpm flat-six is a siren call for extralegal speeds. Above 6000 rpm, the soundtrack picks up an edge that takes over as the needle howls around the tach. It's so frenzied at redline that all you can think about is grabbing the next gear and feeling that smooth swell of power pull you to nirvana again. Who cares that third tops out at 109 mph and fourth reaches 140? There's probably not a cop around at exactly this moment! Without turbos, the 911 GT3's flat-six is down more than 160 pound-feet compared with the V-8s, but revs are a far more stirring way of making power. And the GT3 is efficient, too. The Aston's gearing gives it a huge advantage in EPA testing, but on our drive, the Porsche eked out victory by a single mpg.

The GT3 was unanimously our favorite highway mount. As senior online editor Mike Sutton put it, "Despite its exquisite feel

As with its exterior, the GT3's interior could easily be mistaken for a run-of-the-mill 911's. The sweet soundtrack is the giveaway, though.



FINAL RESULTS

Shell
V-Power
NITRO+
Premium Gasoline
The Official Fuel of
CAR AND DRIVER

ASTON MARTIN VANTAGE
MERCEDES-AMG GT C
▶ PORSCHE 911 GT3
Maximum points available

RANK	1	2	3
VEHICLE			
DRIVER COMFORT	10	9	7
ERGONOMICS	10	9	7
CARGO SPACE*	5	5	3
FEATURES/AMENITIES*	10	3	10
FIT AND FINISH	10	9	10
INTERIOR STYLING	10	7	9
EXTERIOR STYLING	10	6	8
REBATES/EXTRAS*	5	0	0
AS-TESTED PRICE*	20	20	18
SUBTOTAL	90	68	72
POWERTRAIN			
1/4-MILE ACCELERATION*	20	18	20
FLEXIBILITY*	5	3	4
FUEL ECONOMY*	10	10	8
ENGINE NVH	10	10	9
TRANSMISSION	10	10	8
SUBTOTAL	55	51	49
CHASSIS			
PERFORMANCE*	20	20	18
STEERING FEEL	10	10	7
BRAKE FEEL	10	10	8
HANDLING	10	9	8
RIDE	10	9	7
SUBTOTAL	60	58	48
EXPERIENCE			
FUN TO DRIVE	25	24	21
TOTAL	230	201	190

*These objective scores are calculated from the vehicles' dimensions, capacities, rebates and extras, and/or test results.

and performance, one of the most impressive traits of this car is how docile, comfortable, and easy to live with it is." Its stance tucks the tires so snugly into the wheel wells that you half expect the car to pop up on hydraulics before driving away, but the GT3 suffers no impact harshness or noise over bumps, ignoring imperfections like a grand tourer.

And the engine's home behind the cabin makes the 911 feel as if there's nothing but legroom in front, with not even our six-foot-seven driver needing to put the seat all the way back. The view out is positively panoramic. One of us compared the Aston's with the Chevrolet Camaro's pill-box visibility; the 911's is more like the commanding view from a UPS truck. It is loud, however—the space where the rear seats live in other 911s functions here as a big echo chamber for the buzz saw lurking behind. Merge onto the highway and you'll be happy the exhaust has a (relatively) quiet mode.



Dive down an exit ramp into some Appalachian foothills, though, and you'll be happier still. Your fingertips tingle with feedback from the front 245/35ZR-20 Michelin Pilot Sport Cup 2s, which generate enormous grip despite being the narrowest in the test. It helps that they're supporting just 40.1 percent of the GT3's weight, which, at 3303 pounds, is more than 400 pounds lighter than either of the other cars.

The Porsche combines the Mercedes-AMG's unflinching front-end grip with the Aston Martin's willingness to rotate, its nose staying attached to the pavement as the tail responds in minute degrees to load shifts without evincing the slightest shred of spooky oversteer that old guys will tell you 911s are prone to.

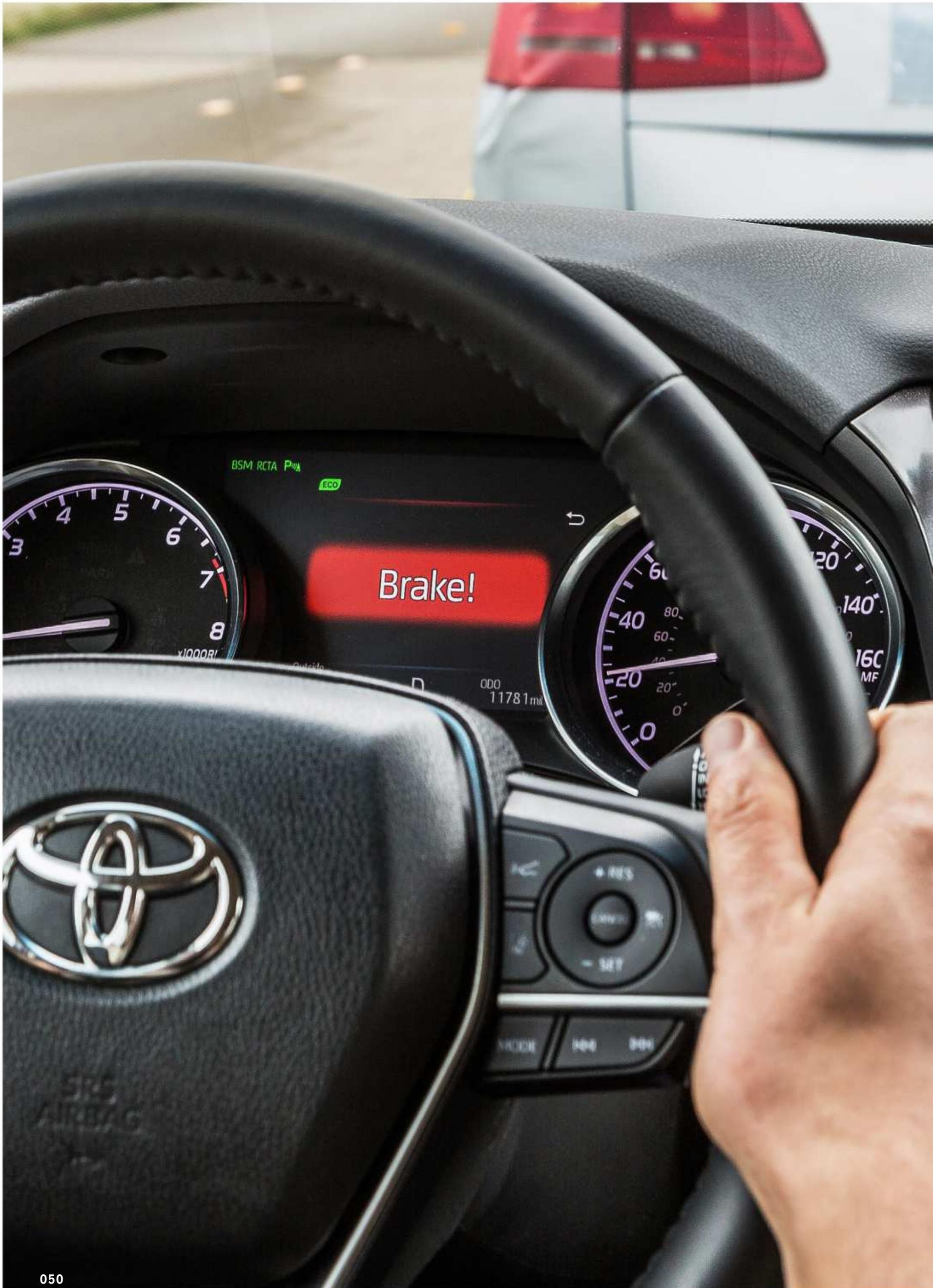
No fair! The GT3 is a track car! Well, sort of. But its smooth ride, roomy interior, and excellent visibility mean it's also the easiest to live with.

It's been a while since snap oversteer was much of a concern for 911s. Unload the rear end, let the car pivot, and then ease back into the throttle; those wide, sticky Cup 2s squatting under the flat-six lock the GT3 onto its heading and it screams out of the turn, tail tacked in place.

At the cars' respective top speeds, the GT3's standard fixed rear wing generates some 230 more pounds of downforce than the 110 pounds of the Touring package's relatively modest retractable spoiler, but that's a difference you'll likely only notice on a very fast racetrack. As much as we like a Q-ship, some of us feel that a 9000-rpm engine deserves a more exciting visual package. We argued endlessly about whether we prefer the look of the GT3 with or without its wing. But either way, we all agreed that we prefer the GT3. 🇩🇪

Porsche 911 GT3 [+] A more satisfying pairing of engine and transmission does not exist; deftly balances capability and livability. [-] That's a lot of money to spend for cloth seats; it's possible to be too stealthy. [=] If we could have only one car for the rest of our lives, the kids would have to walk.





Brake Check // Automated-emergency-braking systems are designed to mitigate or stop a crash before it happens. Sometimes they don't.



BY ERIC TINGWALL//
PHOTOGRAPHY BY ANDI HEDRICK //

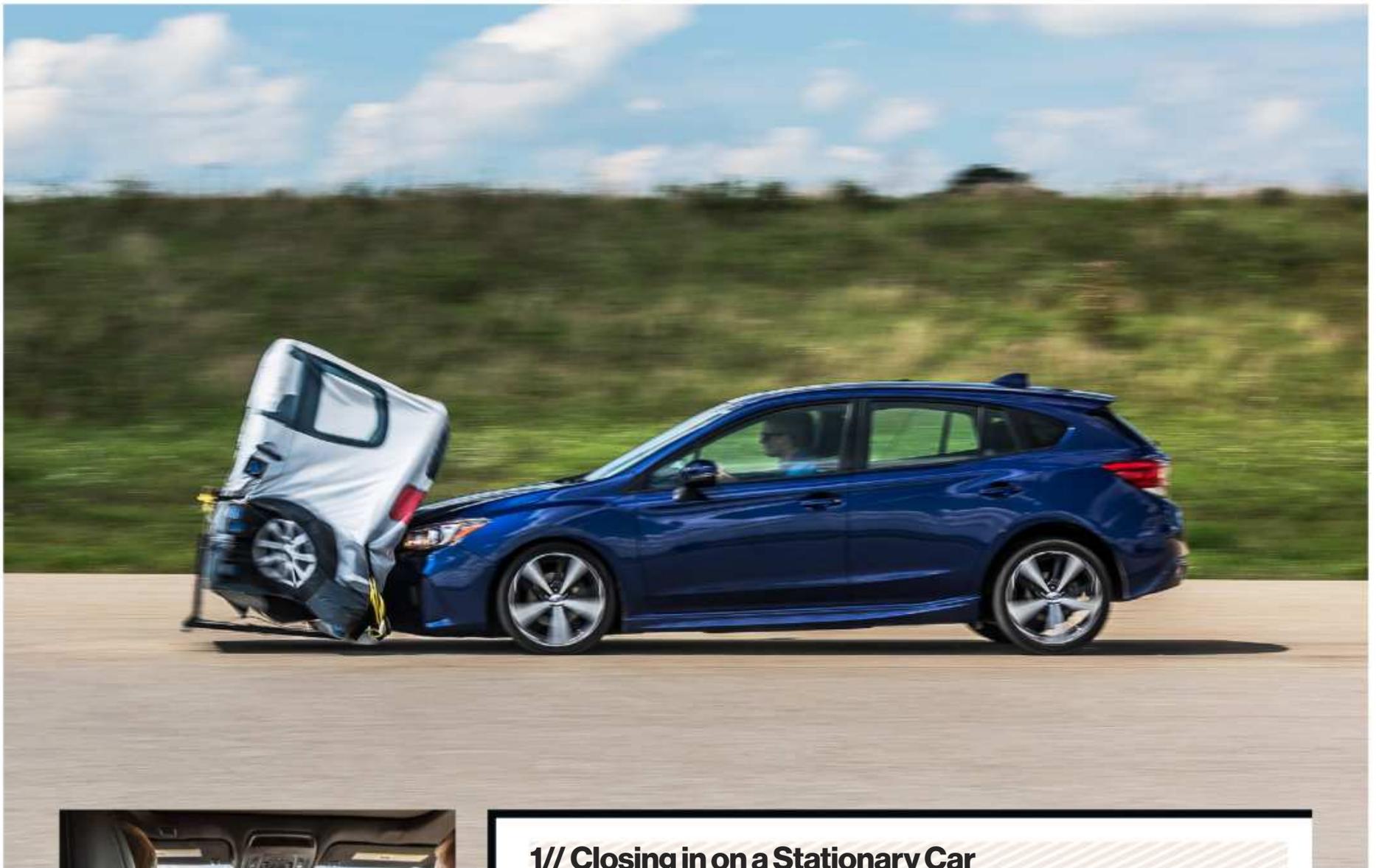
The kick-drum thump of a harmless 30-mph shunt into an inflatable faux car rouses the same visceral remorse as a real car crash. The stomach knots with nausea. Mortification burns deep in every muscle. Within seconds, the brain catalogs the near trauma under Things That Should Not Be Repeated, right next to beer pong played with Captain Morgan.

Against our instincts, we keep taking runs at the balloon car. We nudge, punch, and plow into the generic air-filled Volkswagen again and again and again, not unlike American drivers, who, in 2016, drove into the back ends of other vehicles 2.4 million times. The rear-end collision is America's favorite way to bend sheet-metal, accounting for nearly one-third of all crashes.

But for every hit in our testing, there are several more kamikaze runs where the test car shudders to a halt just inches from the half-a-car punching bag. This is the work of automated emergency braking (AEB), which can detect an imminent rear-end collision and apply the brakes to mitigate or prevent the impact. Twenty automakers, whose products account for 99 percent of all new-vehicle sales in the U.S., have agreed to equip their full lineups of cars, SUVs, and light-duty trucks with AEB by 2022. But you don't have to wait. AEB is already ubiquitous in new vehicles at every price point, either as standard or optional equipment, and the data suggests that it's working as intended. A 2016 Insurance Institute for Highway Safety study found that vehicles equipped with forward-collision warning (an audible, visual, and/or vibrating alert given when the system detects a hazard

// Don't Panic!

With automated-emergency-braking systems set to be available on virtually all new vehicles by 2022, drivers might not rear-end each other with the same frequency as they do today. Still, they might also want to just pay attention.



ahead) and AEB were involved in 39 percent fewer rear-end crashes than vehicles without the technologies.

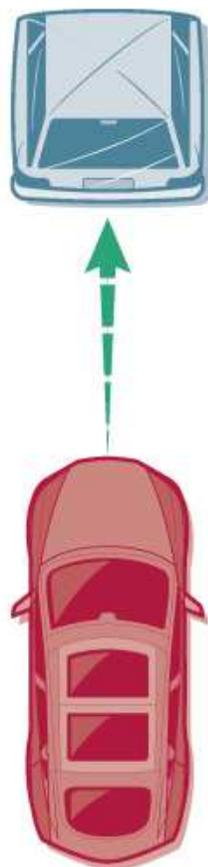
To understand the strengths and weaknesses of these systems and how they differ, we piloted a Cadillac CT6, a Subaru Impreza, a Tesla Model S, and a Toyota Camry through four tests at FT Techno of America's Fowlerville, Michigan, proving ground. The balloon car is built like a bounce house but with the radar reflectivity of a real car, a five-figure price, and a Volkswagen wrapper. For the tests with a moving target, a heavy-duty pickup tows the balloon car on 42-foot rails, which allow it to slide forward after impact.

The car companies don't hide the fact that today's AEB systems have blind spots. It's all there in the owner's manuals, typically covered by both an all-encompassing legal disclaimer and explicit examples of why the systems might fail to intervene [see "You Can't, You Won't, and You Don't Stop," page 055]. For instance, the Camry's AEB system may not work when you're driving on a hill. It might not spot vehicles with high ground clearance or those with

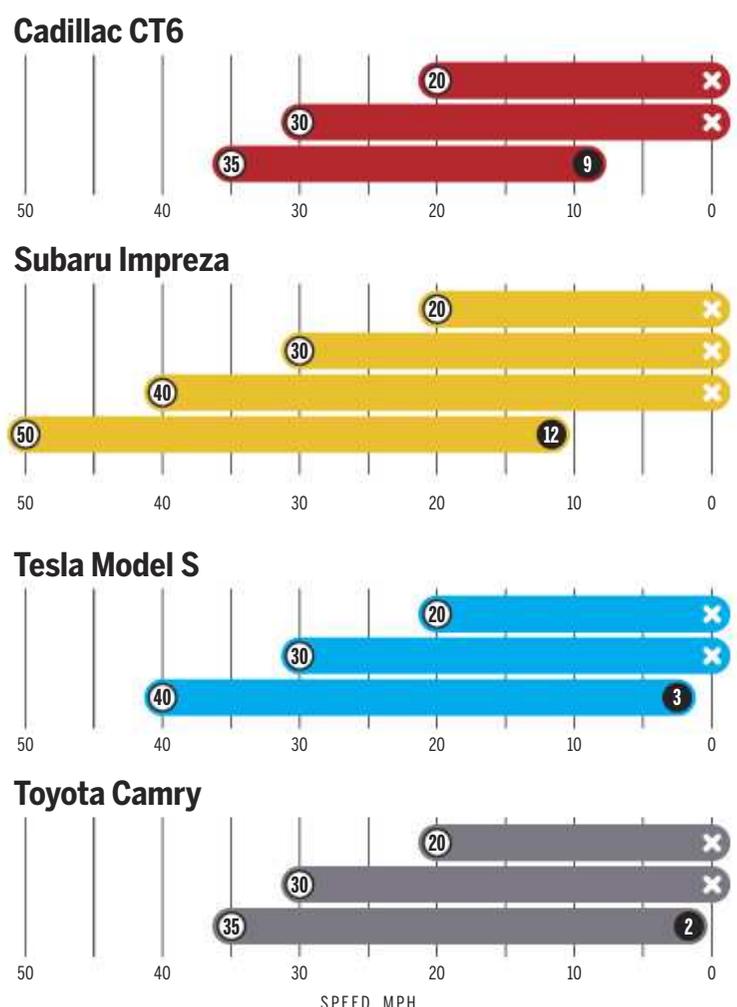
1// Closing in on a Stationary Car

The Test: Drive the test vehicle toward the stationary balloon car at a steady speed, increasing each run's speed until the AEB system is unable to prevent a collision.

The Takeaway: Subaru's radarless EyeSight system is surprisingly robust, capable of preventing a collision at 45 mph while the competitors all hit the target at lower speeds. On its second attempt at 50 mph, the Subaru shaved off 38 mph before impact.



○ Approach Speed ● Collision Speed ✕ No Collision

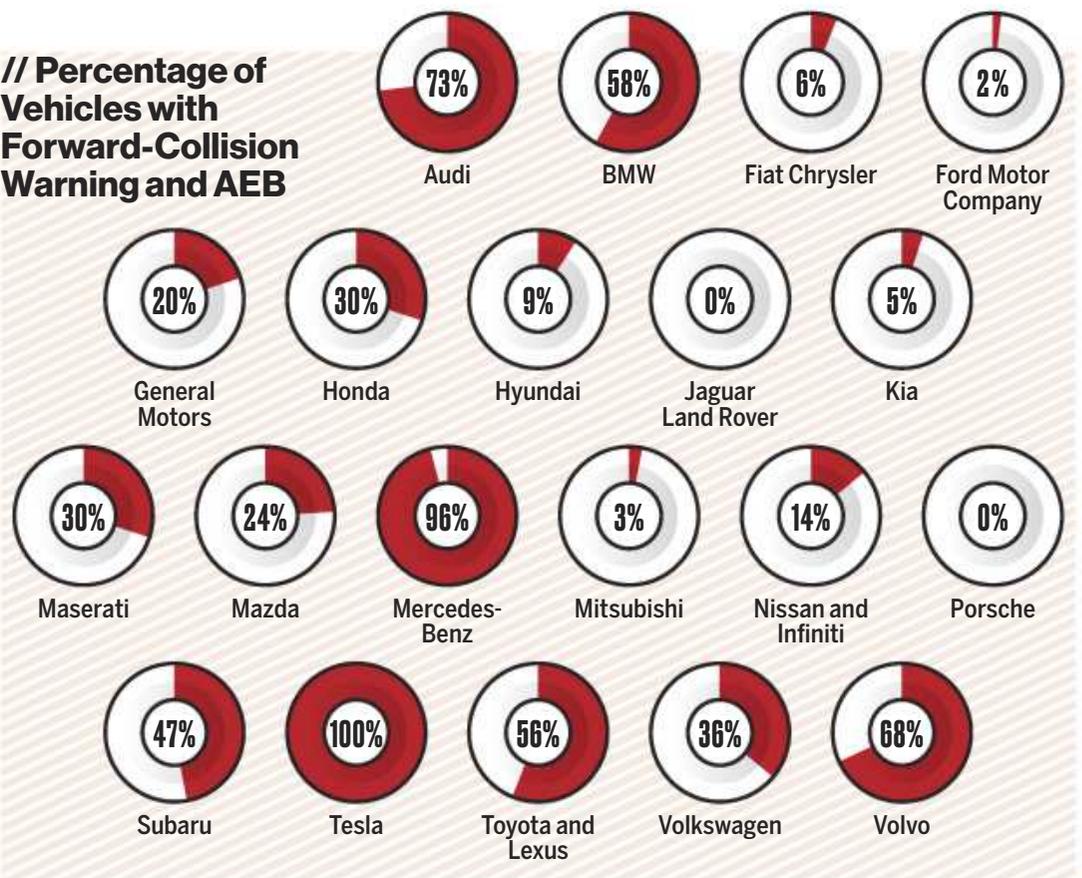


low rear ends. It may not work if a wiper blade blocks the camera. Toyota says the system could also fail if the vehicle is wobbling, whatever that means. It may not function when the sun shines directly on the vehicle ahead or into the camera mounted near the rearview mirror.

There's truth in these legal warnings. AEB isn't intended to address low-visibility conditions or a car that suddenly swerves into your path. These systems do their best work preventing the kind of crashes that are easily avoided by an attentive driver.

The edge cases cover the gamut from common to complex. Volvo's owner's manuals outline a target-switching problem for adaptive cruise control (ACC), the convenience feature that relies on the same sensors as AEB. In these scenarios, a vehicle just ahead of the Volvo takes an exit or makes a lane change to reveal a stationary vehicle in the Volvo's path. If traveling

// Percentage of Vehicles with Forward-Collision Warning and AEB



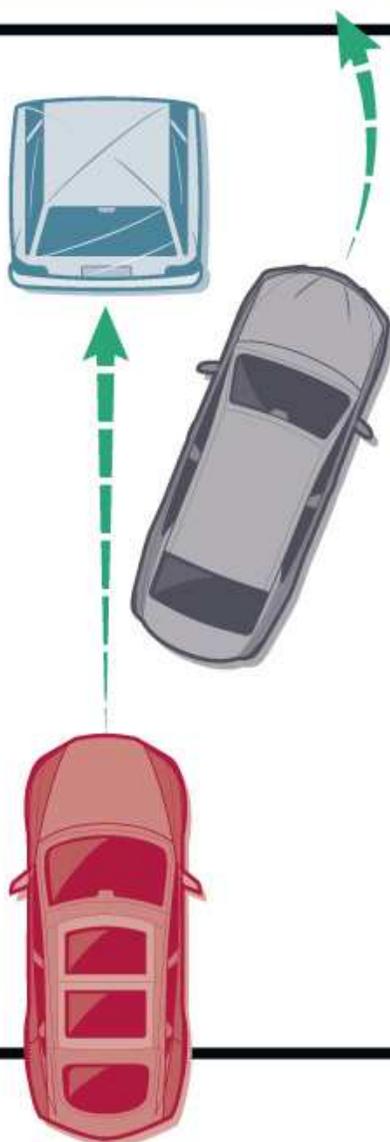
For vehicles built between September 1, 2016 and August 31, 2017. Excludes heavy-duty trucks.



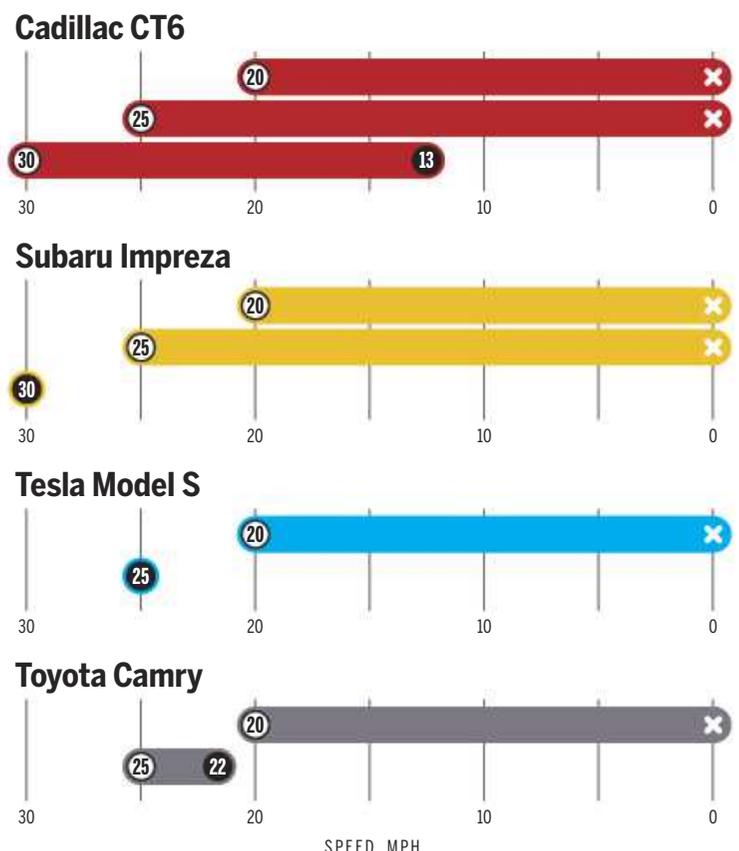
2// Target Switching to a Stationary Car

The Test: Trail a lead car with the test vehicle at two car lengths and a set speed. Thirty feet from the balloon-car target, the lead car makes an abrupt lane change while the test car continues straight. Repeat the test, increasing the set speed until the test vehicle's AEB system is unable to avoid a crash.

The Takeaway: All four cars hit the target from initial speeds below those observed in the simpler first test. The Subaru and the Tesla struck the balloon without any braking. When the lead car moves over to reveal a stationary obstacle, the systems simply don't have time to process the threat, let alone react to it.



○ Approach Speed ● Collision Speed ✕ No Collision





We conducted all our tests on dry pavement but shot our photography after the rain came because otherwise the photographer overheats.

above 20 mph, the Volvo will not decelerate, according to its maker. We replicated that scenario for AEB testing, with a lead vehicle making a late lane change as it closed in on the parked balloon car. No car in our test could avoid a collision beyond 30 mph, and as we neared that upper limit, the Tesla and the Subaru provided no warning or braking.

At the moment, automakers have few incentives to push AEB performance beyond the tests already used in regulatory assessment programs and safety ratings. NHTSA's stationary-vehicle AEB test is performed at a single speed, 25 mph, and it only requires that the vehicle scrub off 9.8 mph before impact. In our testing, all the cars easily cleared that low bar, but one model stood far above the rest. The Subaru Impreza—the least expensive car of the four, with a stereo-camera system that eschews the usual radar sensor—still prevented a collision at 45 mph, a higher speed than any other car here, before it nosed into the stationary inflatable target.

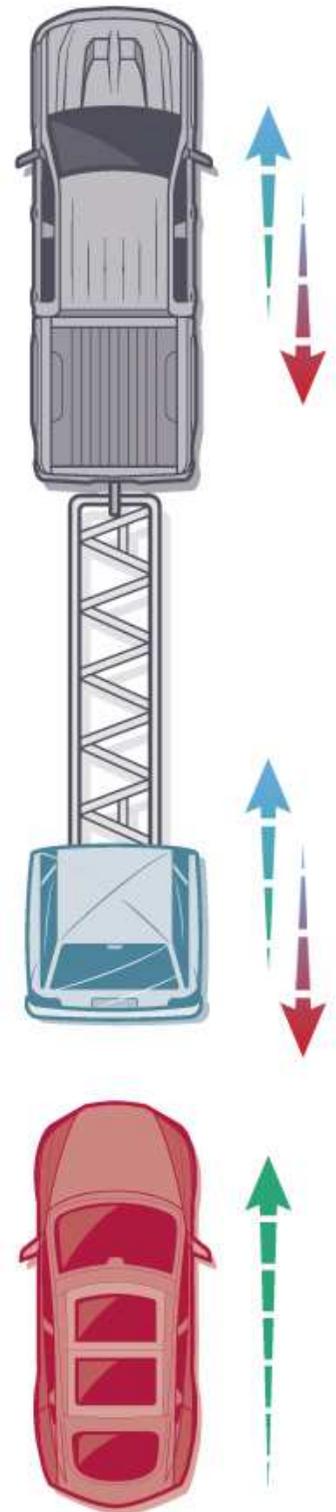
The balloon car is firm enough that we only ran our test cases until we found the speed at which an impact was unavoidable. But Thatcham Research, the U.K.'s analogue to America's IIHS, has conducted similar trials at high-enough speeds to know that these systems ultimately reach a threshold where they will neither alert nor brake for a stationary vehicle. Instead, they'll slam into a stopped car at full speed. "As speeds get higher, physically the car can't understand the situation and stop quickly enough. We've seen that with the ACC systems as well," says Matthew Avery, director of insurance research at Thatcham.

Avery explains that manufacturers also face a challenge in deciding whether the system should intervene if there's a possibility that the driver intends to steer around a stopped car or that the vehicle might move out of the way. Along those lines, carmakers are also rightfully self-conscious of how often an AEB system acts on a false positive, with the computer applying the brakes in the absence of a threat. In 2015, NHTSA opened a yearlong investigation into 95,000 Jeep Grand Cherokees following reports that the SUVs were braking for no reason. The probe turned up 176 complaints of inexplicable emergency braking, but the agency found no defects and ultimately decided not to issue a recall. For the moment, these annoyances simply have to be tolerated by automakers and their customers. "From a technological perspec-

3// Maximum Deceleration

The Test: Progressively increase the braking force of the towed inflatable car to find the maximum deceleration rate of the ACC system before AEB activates.

The Takeaway: Toyota pushes its automated systems closest to the vehicle's maximum capabilities. Perhaps more significant than its AEB performance, the Camry's higher maximum ACC braking force means the vehicle is better equipped to deal with slow-moving traffic on the highway without requiring the driver to intervene or resorting to unsettling last-second panic braking.



- ACC ● AEB
- Driver-Initiated Panic Stop

Cadillac CT6



Subaru Impreza



Tesla Model S



Toyota Camry



tive, if you'd like to reduce the rate of false positives, the rate of false negatives [crashes in which AEB does not activate] has to go up, and vice versa," says Raj Rajkumar, co-director of the General Motors-Carnegie Mellon Autonomous Driving Collaborative Research Lab.

Our tests also exposed the infallibility myth that surrounds computers and automated vehicles. Driving the same car toward the same target at the same speed multiple times often produces different results. Sometimes the car executes a perfectly timed last-ditch panic stop. Other times it brakes late, or less forcefully, or even periodically fails to do anything at all. In our stationary-vehicle test, the Impreza's first run at 50 mph resulted in the hardest hit of the day, punting the inflatable target at 30 mph. It was only on the second attempt that the Subaru's EyeSight

system impressively trimmed the speed to just 12 mph before the collision. All the results in the charts in this feature show a car's best performance.

Rajkumar says the next-generation AEB technology could improve on two fronts: Artificial intelligence may evolve to better identify collision threats and apply the brakes appropriately, and the addition of more-expensive lidar sensors could bring another level of certainty and precision to detecting obstacles. Collision-avoidance systems are the airbags of the 21st century, reframing automotive safety. But this time, the industry is shifting from technology that protects occupants in a crash to preventing the impact in the first place. Today's systems are impressive and likely to get only better, but know that even a good AEB system is no substitute for a diligent driver. ■

// You Can't, You Won't, And You Don't Stop

Before we even booked the test track, we had already discovered differences among the driver-assist systems in our test cars—in their owner's manuals. Just as carmakers have dissimilar approaches to engineering these systems, their legal teams diverge in the writing of their warnings and disclaimers.

All the manuals we looked at gave drivers a general directive similar to this one from Cadillac: "Your complete attention is always required while driving and you should be ready to take action and apply the brakes." But while each manual also warned of situations in which automated emergency braking and other active-safety features might not work, they varied in their degrees of specificity. Toyota's attorneys seem to be the wariest; accompanying the two pages in the Camry's manual describing the operation of its pre-collision system are nine others detailing its limitations.

The primary purpose of all this is to shield the automaker from lawsuits that might arise if a safety system fails to prevent an accident. Yet the carmakers also want to head off class-action suits that claim the technology is defective because of false positives (i.e. instances when the systems engage unnecessarily). A group of plaintiffs filed exactly such a suit against Honda in May.

Unsurprisingly then, neither GM nor Toyota would go on record with us. However, Stanford Law School professor Robert L. Rabin tells us that when it comes to "hold harmless agreements" such as these, a more expansive approach is more effective at shielding the carmaker. "It's better if the manufacturer can foresee all of the likely risks," he says. "It also maybe increases the degree of urgency to point out that there are a number of possible risks that the user should be aware of, rather than being lulled into a sense of security by a more general umbrella-type warning."

Still, consumers can and do bring legal action against car companies despite such warnings. Disclaimers buried in the manuals—the Camry's tome runs to 612 pages—can easily be dismissed by plaintiffs' attorneys as unread. "Warning law generally depends on what you would expect the reasonable consumer to digest," says Rabin. "It's a murky area." —Jeff Sabatini

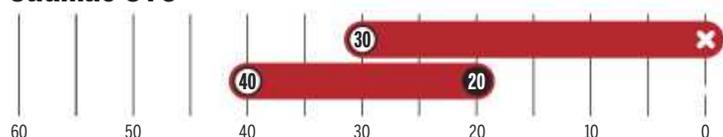
4// Approaching a Slower Moving Vehicle

The Test: With the inflatable car traveling at 10 mph, approach it with the test vehicle at a steady speed. Increase the test vehicle's speed until AEB is unable to prevent a collision.

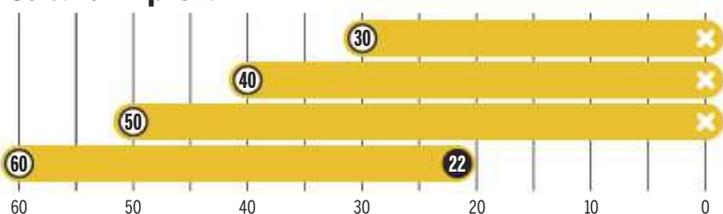
The Takeaway: The Subaru again takes top marks, cutting a 50-mph speed differential down to a 12-mph relative speed at impact. Both the Toyota and the Tesla transition from collision avoidance to mitigation at lower speeds and with less effectiveness. The Cadillac is a clear fourth place.

○ Approach Speed ● Collision Speed ✕ No Collision

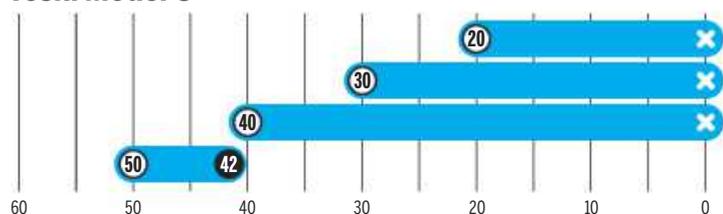
Cadillac CT6



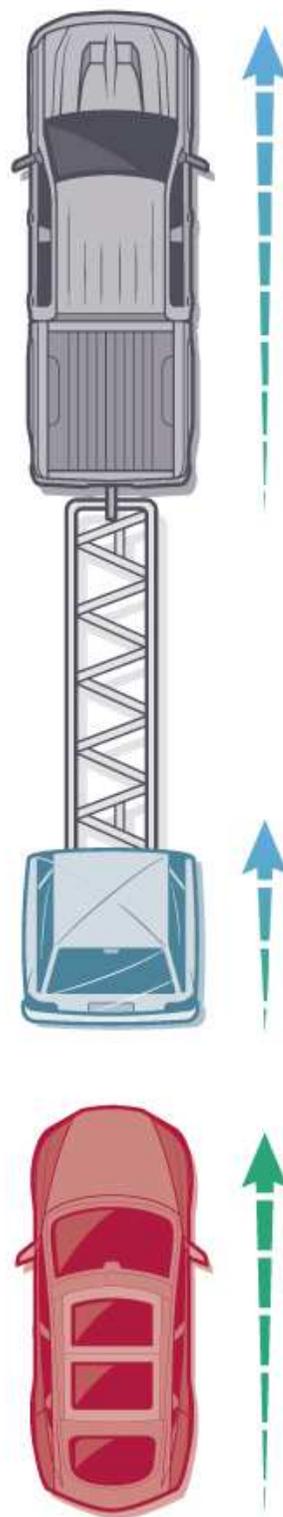
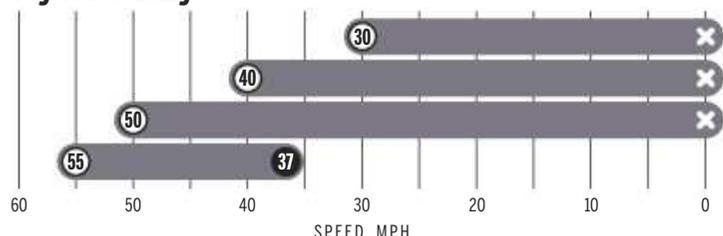
Subaru Impreza



Tesla Model S



Toyota Camry



The middle man would like a word

The fully redesigned
2019 Nissan Altima
is packing heat in
the mid-size segment.
by Josh Jacquot
photography by Marc Urbano







A

s ideas go, this one might not make automotive history, but it's the kind of thing we think about between rounds of office Plinko. Nissan could have executed the most accurate and brilliant car-branding plot in history when it named its sedans. Consider this: After the introduction of its big car, the Maxima, in 1981, a natural next step would have been to call its new small sedan for 1982 the Minima. Without consulting us,

Nissan named it the Sentra. Ten years later, when the company trotted out its revised mid-size sedan, it could have completed the trifecta by calling it the Media. Minima, Media, and Maxima are names so easy to remember that even *Motor Trend* could do it.

But it was not to be. Nissan's mid-size car is the Altima. Has been since 1992, during which time Nissan dealers have unloaded some 5.6 million of them. Nissan sold more than a quarter-million Altimas in 2017, and the car ranks third in sales among mid-size sedans through August 2018. While it continues to lose ground to the Rogue, the Altima still accounts for more than 17 percent of the company's total U.S. sales. So this fully redesigned model, the sixth generation of the middle man, matters a lot.

We don't care how many it sells, because popularity and desirability converge on the same car with Hale-Bopp rarity. But that just happens to be the exact dilemma facing Nissan. Honda's Accord not only outsells the Altima, it made our 2018 10Best list—and 31 10Best lists before that, more appearances than any other car. That it's the standard bearer in the class is clear. That Nissan has the savvy required to displace it is less so. "There's nothing grievously wrong with the Altima . . . We just wish there were more right with it," we said in a tepid review of the 2018 model.

Yet, when this Scarlet Ember—okay, it's red—sedan rolled in to C/D HQ, we stood up. Its tapered nose, trapezoidal grille, and 19-inch wheels triggered emotions not usually activated by cars in the appliance class. This, at least, is a proper-looking sedan.

Pleasantly uncluttered and made of decent-quality materials, the new Altima's interior is let down only by tragically fake wood trim on the dashboard.

SR and Platinum trims offer Nissan's most recent engineering achievement. The KR20DDET inline-four in our Platinum test car is a turbocharged 2.0-liter capable of varying its compression ratio from 8.0:1 to 14.0:1. Due to a revised engine calibration, its 248 horsepower is down 20 from the version in the 2019 Infiniti QX50, where this engine made its debut. Torque remains the same, though, at 280 pound-feet. The VC-Turbo's party trick is the ability to cruise at high-compression ratios for efficiency then switch to the knock resistance of a low-compression engine under load, allowing for greater boost levels. A CVT driving the front wheels is the only transmission available with the turbocharged powerplant, and in SR trims, it comes with paddle shifters.

The EPA says the Altima is good for 29 mpg combined, 3 mpg better than last year's V-6-powered model and topping the turbocharged 2.0-liter 10-speed Accord EX-L by 2 mpg. Otherwise, all





2019 NISSAN ALTIMA PLATINUM EDITION ONE

PRICE
AS TESTED **\$36,645**
BASE \$36,645

VEHICLE TYPE: front-engine, front-wheel-drive, 5-passenger, 4-door sedan

OPTIONS: none

AUDIO SYSTEM: satellite radio; minijack, USB, and Bluetooth-audio inputs; Android Auto and Apple CarPlay interfaces; 9 speakers

ENGINE

turbocharged and intercooled variable-compression Miller-capable inline-4, aluminum block and head

BORE X STROKE 3.31 x 3.50–3.55 in, 84.0 x 88.9–90.1 mm

DISPLACEMENT 120–122 cu in, 1971–1997 cc

COMPRESSION RATIO 8.0–14.0:1

FUEL DELIVERY SYSTEM: port and direct injection

TURBOCHARGER Honeywell GT20

MAXIMUM BOOST PRESSURE 23.2 psi

VALVE GEAR: double overhead cams, 4 valves per cylinder, variable intake- and exhaust-valve timing

REDLINE/FUEL CUTOFF 6000/6000 rpm

POWER **248 hp @ 5600 rpm**

TORQUE **280 lb-ft @ 1600 rpm**

DRIVETRAIN

TRANSMISSION: continuously variable automatic

FINAL-DRIVE RATIO 5.25:1

GEAR	RATIO	MPH PER 1000 RPM	MAX SPEED IN GEAR (rpm)
lowest	2.43	6.0	36 mph (6000)
highest	0.38	38.2	142 mph (3700)

CHASSIS

unit construction with 2 rubber-isolated subframes

BODY MATERIAL: steel and aluminum stampings

STEERING

rack-and-pinion with variable electric power assist

RATIO 15.3:1

TURNS LOCK-TO-LOCK 2.7

TURNING CIRCLE CURB-TO-CURB 37.4 ft

SUSPENSION

F: ind, strut located by a control arm, coil springs, anti-roll bar

R: ind, 1 control arm and 1 lateral link per side, coil springs, anti-roll bar

anti-roll bar

anti-roll bar

BRAKES

F: 11.7- x 1.0-in vented disc, 1-piston sliding caliper

R: 11.0- x 0.4-in disc, 1-piston sliding caliper

STABILITY CONTROL fully defeatable

WHEELS AND TIRES

WHEEL SIZE 8.0 x 19 in

WHEEL CONSTRUCTION cast aluminum
TIRES: Hankook Kinergy GT 235/40R-19 92V M+S

EXTERIOR DIMENSIONS

WHEELBASE	111.2 in
LENGTH	192.9 in
WIDTH	72.9 in
HEIGHT	56.9 in
FRONT TRACK	62.8 in
REAR TRACK	62.8 in
GROUND CLEARANCE	5.1 in

INTERIOR DIMENSIONS

PASSENGER VOLUME	F: 56 cu ft R: 43 cu ft
TRUNK VOLUME	15 cu ft

CAR AND DRIVER TEST RESULTS

ACCELERATION

ZERO TO	SECONDS
30 MPH	2.4
40 MPH	3.4
50 MPH	4.5
60 MPH	5.9
70 MPH	7.6
80 MPH	9.5
90 MPH	11.8
100 MPH	14.7
110 MPH	18.2
120 MPH	22.6
130 MPH	28.7
140 MPH	37.1
ROLLING START, 5–60 MPH	6.4
TOP GEAR, 30–50 MPH	3.6
TOP GEAR, 50–70 MPH	4.1
1/4-MILE	14.5 sec @ 99 mph
TOP SPEED	142 mph (drag ltd)

HANDLING

ROADHOLDING, 300-FT-DIA SKIDPAD **0.91 g**
UNDERSTEER moderate

BRAKING, 70 TO ZERO MPH

SHORTEST STOP	172 ft
LONGEST STOP	176 ft
FADE RATING	none

WEIGHT

CURB	3466 lb
PER HORSEPOWER	14.0 lb
DISTRIBUTION	F: 60.7% R: 39.3%
CENTER-OF-GRAVITY HEIGHT	21.0 in

FUEL

CAPACITY	16.2 gal
OCTANE	91 (recommended)
EPA COMBINED/CITY/HWY	29/25/34 mpg
C/D OBSERVED	25 mpg

INTERIOR SOUND LEVEL

IDLE	40 dBA
FULL THROTTLE	79 dBA
70-MPH CRUISING	70 dBA

five trims come standard with a new 2.5-liter four-cylinder good for 188 horsepower and 180 pound-feet of torque. Front-wheel drive and a CVT are standard, but the all-wheel-drive system available with the 2.5-liter is a segment rarity.

Innovative powertrains alone do not make a winning mid-size sedan, however. In this class, the minutiae separate good from great. It's the Accord's all-encompassing richness and low-stress demeanor that make it a favorite. Nissan knows this, which is why it streamlined the Altima's HVAC controls, positioned its 8.0-inch infotainment screen higher on the dash, retained the all-day-comfortable seats, and gave it a small-diameter thick-rimmed steering wheel. It's a modern, functional presentation that doesn't pretend to be a luxury car but also doesn't saddle drivers with goofy gimmicks such as a push-button shifter. Materials in our top-trim model were nice enough, but the fake wood on the dash will fool no one.

Maybe it won't need to. There are so many other things to like about the Altima, starting with its roominess. Jam them into some cars in this class and our biggest staffers look like Bowser in *Mario Kart*. But here, with the front seat adjusted for their own driving positions, six-and-a-half-footers fit comfortably in the back. The rear quarters are big enough that almost everyone will be comfortable, but they do lack the startling airiness of the Accord's.

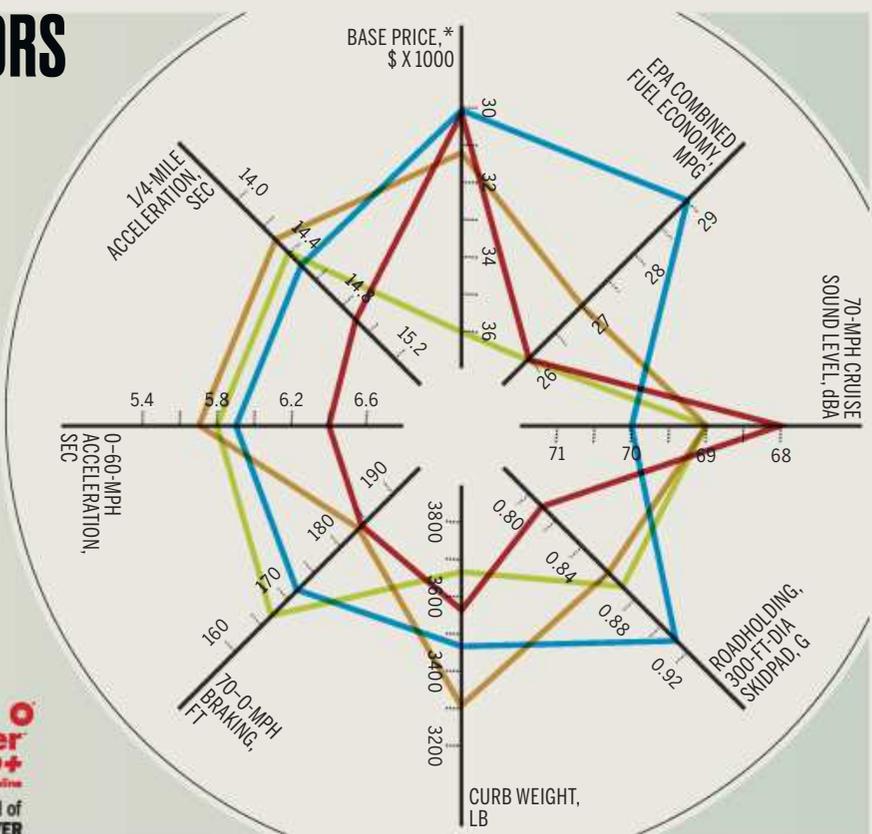
Our test car surged to 60 mph in 5.9 seconds, quicker than many buyers in this

COMPETITORS

Now that it's common for a mid-size sedan to hit 60 mph in the five-second range, it shouldn't be a surprise when one of them turns 0.91 g on the skidpad.

- **HONDA ACCORD**
252-HP 2.0-L I-4, 10-SP AUTO
- **MAZDA 6**
250-HP 2.5-L I-4, 6-SP AUTO
- **NISSAN ALTIMA**
248-HP 2.0-L I-4, CVT
- **TOYOTA CAMRY**
301-HP 3.5-L V-6, 8-SP AUTO

*Includes performance-enhancing options.





The front end of the new Altima looks only slightly like Ghostface from *Scream 4*. Did you know VC-T is an anagram of CVT? Coincidence?

class will ever care to travel. But it is a few tenths less rapid than the last 2.0-liter 10-speed Accord we tested, which also retained its lead through the quarter-mile. The Altima's CVT lacks the immediacy and control offered by the Accord's transmission—especially in the Nissan's Platinum trim, which lacks paddle shifters. And there's no denying the wind-up effect at wide-open throttle, a product of the combined delays of building boost and a CVT changing ratios. Sport mode sharpens throttle response by holding the engine about 500 rpm higher, which you'll only notice if you're paying attention. But adequate low-rpm torque is the cure for CVT drone, and the Altima has it. It's quick enough that you'll not be burdened by that old gripe for more than a couple seconds at a time. Truth is, all but the most ardent CVT haters will find this to be a perfectly competent and exceedingly smooth transmission.

We like the Altima's accurate, controlled handling despite the fact that it's helicopter-parented by multiple electronic aids. Nissan's Intelligent Trace Control smoothly applies braking force to individual wheels to help the car follow the driver's chosen path. Technically, it's a function of the stability-control system, but unlike so many of those, it works behind the scenes. Speed-sensitive steering ramps up effort with pace, is amply precise, and doesn't fall into the trap of some other Nissan products, which substitute effort for feel. No mid-size sedan we've tested recently can match its 0.91-g stranglehold on the skidpad, a feat it accomplished on big, if modest, 235/40R-19 Hankook Kinergy GT all-season tires. Even without the more aggressive suspension tune of the SR, which brings 10 percent stiffer springs and dampers to match, the Platinum is proficient at cornering speeds that will only be asked of a car like this if its keys are proffered over the battered Formica of a rental counter. The Altima sticks comfortably even on the most cratered of southern Michigan's roads, the suspension vectoring it ably through bends without a commensurate penalty in ride quality. Braking is competent and predictable, though at 172 feet from 70 mph to zero, it's only midpack.

A big part of the Altima's sales pitch is its tech package, which is led by ProPilot Assist. Nissan's initial foray into semiautomated driver assistance, ProPilot Assist starts with adaptive cruise con-

[+] Handling exceeds most mid-sizers, plenty quick with turbo 2.0, CVT is better than most of its ilk.

[-] CVT still not as good as conventional auto-matics, some tech burdens masquerading as assistants.

[=] A genuine mid-size contender.

rol and then adds steering assistance with the goal of keeping the Altima centered in its lane. It will bring the sedan to a complete stop in traffic and resume forward motion with the touch of a button. We found it most useful in stop-and-go driving, rather than faster-moving environs where the steering assist's constant pull was distracting. ProPilot is standard on the top three trims (SV, SL, and Platinum). Lane-departure warning and rear automated braking, which applies the brakes if it senses an imminent collision while the car is reversing, also come on those trims.

Automated emergency braking and forward-collision warning are standard on every Altima. Rear-cross-traffic alert and blind-spot monitoring are included on all but the base S models. It's a load of tech, much of which is still new in this segment, and at times it feels as if Nissan has successfully toppled Toyota as King of Beep and Vibrate. Most of these aids can be configured or disabled through menus in the instrument panel, and the settings stick across key cycles. But as a reminder that the Altima's tech overlords were always with us, every time we turned onto a gravel road, a robo voice warned, "Caution: unpaved road." Other master-of-the-obvious alerts include flood, construction, and restricted-road warnings. This SiriusXM Traffic-based feature is one you'll pay for on SL and Platinum grades only so you can disable it immediately.

Our Platinum example was an Edition One, which adds exclusive wheels, bric-a-brac like floor mats and illuminated sill plates, and, more usefully, three years of concierge service. It tallied at \$36,645. That it's \$50 cheaper than a top-trim 2018 Honda Accord Touring says that Nissan believes buyers will find Accord-like value in the new Altima. We agree. This is a strong effort, a striking sedan with enough grace to be considered alongside the segment leader, enough room to be on the radar of buyers still considering sedans, and enough technology to carry it through this model cycle. If only Nissan had given it the right name. ■

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ASA GT14
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ASA GT14
17 18 19 20



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Sparco **Terra**
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Sparco **Terra SE**
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Sparco **Trofeo 5**
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FLOW ONE **F1**
18 19 20

FLOW ONE **F3**
18 19 20

FLOW ONE **F4**
18 19 20

Bremmer **Kraft BR14**
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Bremmer **Kraft BR16**
17 18 19



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Enkei Perf. **GW8**
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Enkei Perf. **SS05**
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'18 Toyota Camry LE
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PHILIPS HELLA PIAA
BOSCH Valeo

Startup

illustration by Michael Byers



Derby

Who's going to be the next Tesla? It might be one of these companies. But probably not. by Brett Berk

Since Tesla produced its first car in 2008, dozens of new companies have announced intentions to enter the vehicle market. Some have appeared at auto shows with convincing prototypes. Others were conjured into existence by those seemingly more fluent in HTML than horsepower. We imagine the dawn of the mass-produced automobile a hundred years ago was something like this past decade, although Volkswagen, General Motors, and Toyota will likely prove to be more entrenched than the horse-and-buggy trade.

Many of these would-be automakers seem to regard Elon Musk as their patron saint and are thus fueled by a cocktail of electrification, automation, and ride-sharing stirred with a dash of megalomaniacal executive demagoguery. But when "white space" in the existing mar-

ket means tiny mobility pods more suited to a golf course than a highway, it's no wonder that we've also seen an onslaught of aspiring boutique manufacturers pitching ever more audacious exotic supercars.

Indeed, venture capital is a-flowing, searching for the next Tesla (or profitable Tesla). With that kind of chum in the water, the predators, opportunistic feeders, and bottom dwellers are all rushing to the surface to take a nibble. But when it can cost billions of dollars for an existing car company to develop one new vehicle, can any of these new entities survive long enough to produce a viable product, let alone celebrate a tin anniversary? Here's our guide to 20 of the more credible upstarts, with their chances of success rated on a highly scientific scale.



game changers



WAYMO JAGUAR I-PACE

Waymo

The Vehicles: Google's driverless-car subsidiary has elected to focus on what it does best: software. Waymo intends to launch a national ride-hailing service using a fleet of fully automated plug-in-hybrid Chrysler Pacifica minivans and electric Jaguar I-Pace SUVs running its code. (A pilot program is operating in Arizona now.) Considering the parent company's deep pockets and insatiable desire for omnipotence, we may soon be using "Google" as a mobility verb.

Remember, the folks who got richest during the gold rush weren't the miners but the people, like Levi Strauss, who outfitted them. **Announced:** 2009 **Promised:** 2018 **Key Asset:** CEO John Krafcik is the former chief of Hyundai's U.S. operations. **Achilles' Heels:** More Elaine Herzbergs. She's the pedestrian who was hit and killed by an Uber automation-development vehicle in Arizona. Enough incidents like this one and lawmakers and the public

alike may get gun-shy about the technology. **Notable Quote:** "What happened in Arizona obviously was a tragedy. It was terrible. You couldn't watch that video and not be impacted by it. We're very confident that our car could have handled that situation." —Krafcik, in an interview with Forbes **Chance of Success (Out of 10):** 9.2



Cruise CHEVY BOLT

Cruise Automation

The Vehicles: GM products. Perhaps the most notable and viable competitor to Waymo, Cruise was purchased by GM for an alleged nine-figure sum in 2016 and is now working full time to integrate automated technologies into the carmaker's fleet. GM has since agreed to contribute another \$1.1 billion to the venture, and a recent investment of over \$2.2 billion by Japanese tech advisory firm SoftBank Vision Fund guarantees

continued development. **Announced:** 2013 **Promised:** 2019 **Key Asset:** Founder Kyle Vogt, who attended MIT and co-founded Twitch, a platform that allows people to watch others play video games (!). Amazon bought Twitch for nearly \$1 billion in 2014 (!?!). **Achilles' Heel:** GM spent a lot of money on Saturn, too. **Notable Quote:** "At 14 years old, Kyle had built a self-driving Power Wheels car that used a webcam, computer vision, and a power-window motor to follow yellow lines in a parking lot." —GetCruise.com **Chance of Success:** 8.0

electrics

Workhorse

The Vehicle: The W-15 looks like a GMT900 Chevrolet Silverado accessorized by the prop master for *RoboCop*, with underbiting air dams and angular fender flares. It's a plug-in-electric pickup with a range-extending gasoline engine, all-wheel drive, carbon-fiber body panels, and an external power outlet for tools. Electric range is estimated at 80 miles. **Announced:** 2016 **Promised:** 2018 **Key Assets:** The truck market is seemingly bottomless. The company claims it has already presold \$300 million worth of W-15s, mainly to commercial fleets. **Achilles' Heels:** The Tesla pickup, if it ever happens; the improbability of meeting the W-15's promised \$52,500 starting price. **Notable Quote:** "We wanted to get first-mover advantage. We want to beat Tesla by a few years." —Workhorse CEO Stephen Burns, in an interview with TheStreet **Chance of Success:** 6.8

Bollinger Motors

The Vehicle: The B1, a rectilinear electric off-roader with 360 horsepower and a 200-mile range. **Announced:** 2017 **Promised:** 2020 **Key Asset:** Program director Bryan Chambers is an industry veteran who has worked for TRW, MSXI, and Saleen. **Achilles' Heel:** Ford's lawyers may think the B1 looks a bit too much like a Bronco. **Notable Quote:** "Will the B1 have airbags? No... We are engineering the B1 to safety standards that exceed federal regulation using seatbelts." —BollingerMotors.com **Chance of Success:** 6.2

Lucid Motors/Byton

The Vehicles: The Lucid Air and the Byton K-Byte are a pair of nearly indistinguishable entries in the luxury-electric-automated-lozenge class, with specs and configurations that hew closely to the Tesla Model S paradigm. The Lucid is a bit more luxurious and pricey,

WORKHORSE W-15



BOLLINGER B1



LUCID AIR

but the cheaper Byton has a bigger screen, stretching along the dash from A-pillar to A-pillar. **Announced:** 2016/2018 **Promised:** 2019/2021 **Key Assets:** Talented executives from Mazda and Tesla (Lucid) and from Apple, BMW i, and Tesla (Byton). **Achilles' Heel:** Audi, Jaguar, Mercedes, and Porsche are all releasing luxury electric vehicles

in the next year or two. **Notable Quotes:** "Lucid has created a luxury car that transcends the perceived limitations of space, energy, and time." —LucidMotors.com "Of course Tesla was an inspiration; but we were actually inspired more by Apple." —Byton co-founder Daniel Kirchert, in an interview with InsideEVs **Chance of Success:** 5.7

Faraday Future

The Vehicle: The FF 91 is a 1050-hp electric automated crossoverish thing that resembles a suppository. It has lots of screens. Which makes sense, since it was created in part as a mobile content-delivery device conceived when the majority shareholder (and now CEO) Jia Yueting was running the Chinese video-streaming and electronics company LeEco.

Announced: 2017

Promised: 2018

Key Assets: Deep-pocketed investors, such as billionaire Yueting and Chinese healthcare company Evergrande Health.

Achilles' Heels: A slew of fiscal, production, and intellectual-property imbroglios since its founding, epitomized by its prototype bricking itself onstage during its flashy 2017 unveiling.

Notable Quote: "Because the more you use FF 91, the smarter about you it becomes, delivering a truly bespoke experience."

—FF.com

Chance of Success: 4.3

Rivian Automotive

The Vehicles: A five-passenger pickup and an SUV that seats seven will make their debuts at the Los Angeles auto show. Rivian's CEO promises three-second zero-to-60-mph times and off-road performance to shame Jeep and Land Rover. More models will follow, all sharing a similar electric "skateboard" platform. A prototype wearing a Ford F-150 body has been spotted testing.

Announced: 2018

Promised: 2020

Key Assets: In 2017, Rivian purchased the former Mitsubishi factory in Illinois. Its executive team boasts talent from AM General, FCA, and McLaren.

Achilles' Heel: Vague talk of automation, ridesharing, and licensing its technology doesn't do much to obscure that this skunkworks took nine years to develop an electric truck.

Notable Quote: "If we take a step back and we think about what we're launching, at our core, our first product is, we're launching a brand." —Rivian CEO

and founder R.J. Scaringe, in an interview with The Verge.

Chance of Success: 4.2

Evelozcity

The Vehicles: Another familiar electric automated concept but based around a flexible (and heretofore mostly imaginary) skateboard architecture that can support three initial vehicles: an urban commuter car, a ridesharing pod, and a short-range delivery vehicle. Evelozcity was founded mainly by former BMW executives who bailed from Faraday Future.

Announced: 2017

Promised: 2021

Key Asset: Farming out production to contractors instead of building a big, expensive, eternally delayed factory like many of its competitors.

Achilles' Heels: The company's awful name, the scale and diversity of its product offerings, and legal wrangling with Faraday Future.

Notable Quote: "Swept together by destiny in California, we are a multicultural group of designers, engineers, technology and marketing experts that have done this before and know what it takes." —Evelozcity.com

Chance of Success: 3.9

Fisker Inc.

The Vehicles: A globular scissor-door sedan called the EMotion, powered by nonexistent solid-state batteries capable of a full recharge in nine minutes. Also an automated electric shuttle called the Orbit. And, yes, this is another company founded by former BMW and Aston Martin designer Henrik Fisker, whose earlier eponymous car company perished in 2013 after its battery supplier went bankrupt.

Announced: 2016

Promised: 2020

Key Asset: Fisker.

Achilles' Heel: Fisker.

Notable Quote: "Ultimately, when we look up from all the screens, we want to see some really high-quality design."

—Fisker, in an interview with The Verge

Chance of Success: 2.9

supercars

Scuderia Cameron Glickenhaus

The Vehicles: After his experience bringing the Ferrari P4/5 by Pininfarina to life a decade ago, Jim Glickenhaus sought—and was granted—low-volume-manufacturer status from NHTSA. The SCG003S, a mid-engined supercar that's essentially a detuned version of his endurance race car, is his first intended production vehicle. Four subsequent models have been conceived and planned as well.

Announced: 2015

Promised: 2018

Key Asset: Glickenhaus. He's smart, experienced, and wealthy.

Achilles' Heel: Ego, manifesting itself in too many products.

Notable Quote: "We have driven a Ferrari P3/4 in the rain, a Ford Mark IV in the snow, and a Lola Can-Am down the West Side Highway in New York City. After decades improving cars, we were ready to create our own."

—Glickenhaus.Racing

Chance of Success: 7.8

W Motors

The Vehicle: Beirut-founded, Dubai-based W Motors is best known for its 780-hp Lykan HyperSport, featured in the seventh *Fast and Furious* movie. (Also for encrusting the headlights of said production car with diamonds and/or other precious stones.) Its \$1.9 million successor, the 800-hp Fenyr SuperSport, uses proven, RUF-breathed-on, twin-turbo Porsche flat-six components and will be assembled by Magna Steyr, the Austrian contractor that builds the Mercedes G-wagen.

Announced: 2015

Promised: 2019

Key Assets: It has actually built a car before. Also, a functional prototype appeared at the Goodwood Festival of Speed and at Monterey Car Week this summer, looking and sounding mean.

Achilles' Heel: The imminent end of the *Fast and Furious* franchise.

Notable Quote: "The Fenyr SuperSport is a performance-focused supercar. In the core of this machine lies the wolf's heart."

—WMotors.ae

Chance of Success: 6.0

Techrules

The Vehicles: The Ren is a China-made hybrid supercar that uses a diesel-fueled turbine as its range extender. It can be configured with one, two, or three seats and different combinations of electric motors and batteries. Or just go all-in on the claimed 1287-hp track-only Ren RS single-seater.

Announced: 2017

Promised: 2020

Key Asset: An interesting shape penned by Italdesign.

Achilles' Heel: Turbine vehicles have never succeeded because of their inherent liabilities, which include heat and inefficiency.

Notable Quote: "The unique modular design of the Ren chassis and powertrain has enabled us to create a perfectly engineered high-performance track car and demonstrate our TREV [Turbine-Recharging Electric Vehicle] technology in the most efficient way."

—William Jin, founder and CEO of Techrules, in a 2018 Geneva motor show press release

Chance of Success: 3.3

Lyons Motor Car

The Vehicle: Purportedly a 1700-hp, 306-plus-mph, seven-figure

SCUDERIA CAMERON
GLICKENHAUS SCG003S



supercars

carbon-fiber hypercar, the LM2 Streamliner's most notable appearance, at the 2015 New York auto show, revealed it to be a spray-painted lump of foam. Founder Kevin Lyons is a graphic designer who worked at *Cosmopolitan* magazine back in the 1990s. He also scratch-built a Lamborghini Diablo replica without any actual Lamborghini parts. The Streamliner would then be the Venn-diagrammatic intersection of the most fantastical elements of these two divergent reveries.

Announced: 2015

Promised: 2020

Key Asset: Chutzpah.

Achilles' Heel: Everything else.
Notable Quote: "[Lyons] began his artistic education at the age of four, with subsequent studies of the great Renaissance and modern art masters from an early age."

—LyonsMotorCar.com

Chance of Success: 0.5

Devel Motors

The Vehicles: The Sixteen, an Emirati hypercar intended to have 5007 horsepower and break the 300-mph barrier in its top \$1.8 million drag-racing spec. Its Michigan-built quad-turbocharged V-16 is based on a pair of GM LS V-8s. Two roadgoing versions with

DEVEL SIXTEEN



a mere 2000 or 3000 horsepower are also planned. If the Sixteen doesn't work out, the company is developing the Sixty, a six-wheel-drive, dune-destroying SUV.

Announced: 2013

Promised: Yes

Key Asset: Chief engineer Paolo Garella, former head of Pininfarina

Special Projects.

Achilles' Heels: Tires. Three-dimensional reality.

Notable Quote: "Devel Sixteen is born with extreme performance and unimaginable outstanding power of 10 supercars."

—DevelMotors.com

Chance of Success: 0.2

not cars

Chanje Energy

The Vehicle: The V8100 is a China-built, medium-duty electric delivery van with a 150-mile range and DC fast charging. It boasts a 675-cubic-foot cargo hold and a 6000-pound payload capacity.

Announced: 2017

Promised: 2018

Key Asset: It recently signed rental-fleet giant Ryder as its exclusive service provider.

Achilles' Heel: Unproven Chinese manufacturing quality.

Notable Quote: "I know what's going to happen, in my mind. And I'm pretty outspoken about it, and it's shocking that not everybody in the world's an optimist."

—Bryan Hansel, Chanje CEO

Chance of Success: 7.3

Local Motors

The Vehicle: Olli, an automated, toaster-shaped, slow-speed "cognitive shuttle" powered by batteries and IBM's Watson artificial-intelligence software. It's quite an about-face for Phoenix-based Local Motors, which made its name creating the open-sourced *Mad Max*-esque Rally Fighter in 2009.

Announced: 2016

Promised: 2019

Key Asset: It actually seems to make stuff. Olli prototypes are up and running at the University at Buffalo in New York.



ELIO MOTORS

Achilles' Heel: Its small microfactories may not be scalable into the kind of macrofactories needed to produce a vehicle in profit-relevant quantities.

Notable Quote: "We prefer to be called action leaders rather than thought leaders. But we do have thoughts about that."

—LocalMotors.com

Chance of Success: 4.9

Elio Motors

The Vehicle: A three-wheeled two-seater. Elio plans to build the trikes at a decommissioned GM plant in Louisiana.

Announced: 2009

Promised: Over and over again

Key Assets: The company received \$2.5 million from online retailer Overstock.com this spring and plans to raise more money with a cryptocurrency offering.

Achilles' Heel: Elio has consistently moved back its production start date, and its latest promise of late 2019 seems just as specious as those from the past decade.

Notable Quote: "I am confident that this will become my car for at least two-thirds of the days I drive."

—Overstock.com CEO Patrick Byrne, in a 2018 Elio press release

Chance of Success: 3.3

Spira

The Vehicle: The Spira4u is a 520-pound, \$10,000, three-wheeled, motorcycle-based electric transportation pod. A lighter, cheaper gas version is also available.

Announced: 2008

Promised: 2013

Key Assets: Claims to have once broken the Guinness World Record for longest EV journey on a single charge; was an XPrize finalist.

Achilles' Heel: Most people don't want to commute in a proselytizing corporate mission to save production resources, fuel, and lives.

Notable Quote: "I would like to think that if I accidentally ran over my little girl that she would live without much harm."

—Spira founder Lon Ballard, Spira4u.com

Chance of Success: 2.0

Commuter Cars

The Vehicle: One seat wide and two seats long, the two-to-a-lane Tango is an experiment in the capabilities of narrow electric vehicles to combat traffic congestion. Two electric motors deliver an advertised 3000 pound-feet of combined torque.

Announced: 2003

Promised: 2008 and waiting

Key Asset: The first car was delivered to George Clooney.

Achilles' Heels: That delivery was over a decade ago. Hand-built and costing \$240,000, only 12 Tangos have been assembled to date, making mass production unlikely.

Notable Quote: "We very much still exist."

—Rick Woodbury, Commuter Cars president

Chance of Success: 1.1

rip.

Aptera Motors (2006–2011)

All-electric and hybrid two-door three-wheelers.

Fenix Automotive (2009–2012)

British supercars. Founded by kit-car mogul Lee Noble after his departure from Noble Automotive in 2008.

Saba Motors (2009–2012)

Electric two-passenger car. Founded by mechanical engineer Simon Saba in San Jose, California.

Marussia Motors (2007–2014)

Russian supercar. 🇷🇺

*Important Legal Notice from the United States
District Court for the Southern District of Florida*

If you are a current or former owner or lessee of certain Ford, Lincoln, and Mercury vehicles, you could get cash and other benefits from a class action settlement.

Si desea recibir esta notificación en español, llámenos o visite nuestra página web.

A settlement has been reached in a class action lawsuit alleging that consumers sustained economic losses because they purchased or leased vehicles from Ford Motor Company containing allegedly defective airbags manufactured by Takata Corporation and its affiliates. The Settlement includes certain vehicles made by Ford (the "Subject Vehicles"). Ford denies any and all allegations of wrongdoing and the Court has not decided who is right.

If you have already received a separate recall notice for your Ford vehicle and have not yet had your Takata airbag repaired, you should do so as soon as possible. When recalled Takata airbags deploy, they may spray metal debris toward vehicle occupants and may cause serious injury. However, many Ford vehicles affected by this settlement have not been recalled. Please see www.AirBagRecall.com for further details about whether your vehicle is recalled and, if so, what you should do.

Am I included in the proposed Settlement? The Settlement includes the following persons and entities:

- Owners or lessees, as of September 5, 2018, of a Subject Vehicle that was distributed for sale or lease in the United States or any of its territories or possessions, and
- Former owners or lessees of a Subject Vehicle that was distributed for sale or lease in the United States or any of its territories or possessions, who, between June 19, 2014 and September 5, 2018, sold or returned pursuant to a lease, a Subject Vehicle that was recalled before September 5, 2018.

A full list of the Subject Vehicles can be found at www.AutoAirbagSettlement.com. The Settlement does not involve claims of personal injury.

What does the Settlement provide? Ford has agreed to a Settlement with a value of approximately \$299.1 million, including a 20% credit for the Enhanced Rental Car/Loaner Program. The Settlement Funds will be used to pay for Settlement benefits and cover the costs of the Settlement over an approximately four-year period.

The Settlement offers several benefits for Class Members, including (1) payments for certain out-of-pocket expenses incurred related to a Takata airbag recall of a Subject Vehicle, (2) a Rental Car/Loaner Program while certain Subject Vehicles are awaiting repair, (3) an Outreach Program to maximize completion of the recall remedy, (4) additional cash payments to Class Members from residual settlement funds, if any remain, and (5) a Customer Support Program to help with repairs associated with affected Takata airbag inflators and their replacements. The Settlement website explains each of these benefits in detail.

How can I get a Payment? You must file a claim to receive a payment during the first four years of the Settlement. If you still own or lease a Subject Vehicle, you must also bring it to an authorized dealership for the recall remedy, as directed by a recall notice, if you have not already done so. Visit the website and file a claim online or download one and file by mail. The deadline to file a claim will be at least one year from the date the Settlement is finalized and will be posted on the website when it's known.

What are my other options? If you do not want to be legally bound by the Settlement, you must exclude yourself by **November 26, 2018**. If you do not exclude yourself, you will release any claims you may have against Ford, in exchange for certain settlement benefits. The potential available benefits are more fully described in the Settlement, available at the settlement website. You may object to the Settlement by **November 26, 2018**. You cannot both exclude yourself from, and object to, the Settlement. The Long Form Notice for the Settlement available on the website listed below explains how to exclude yourself or object. The Court will hold a fairness hearing on **December 11, 2018** to consider whether to finally approve the Settlement and a request for attorneys' fees of up to 25% of the total Settlement Amount and incentive awards of \$5,000 for each of the Class Representatives. You may appear at the fairness hearing, either by yourself or through an attorney hired by you, but you don't have to. For more information, including the relief, eligibility and release of claims, in English or Spanish, call or visit the website below.

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2017 BMW M2

Arrival: Jan/2017
Departure: Aug/2018

The littlest M shines a light for the rest of the brand. *—by Jared Gall*

BMW's overabundance of 10Best awards and comparo wins isn't based on critical bias any more than David Chang's or Johnny Cash's reputations are. Sometimes, you're just good.

And sometimes, you record "Chicken in Black." Or you make the F30-generation 3- and 4-series, or the decision to call these mechanically identical cars by two different names. Or the M6 convertible. Some of the recent greater offenses to BMW loyalists—electrically assisted power steering, turbocharged M cars, and we'll go ahead and say it: even SUVs—have been necessary adaptations to a changing world. Others, like the sterility of the outgoing 3-series, have been the result of pandering to a customer base the brand shouldn't have been chasing in the first place.

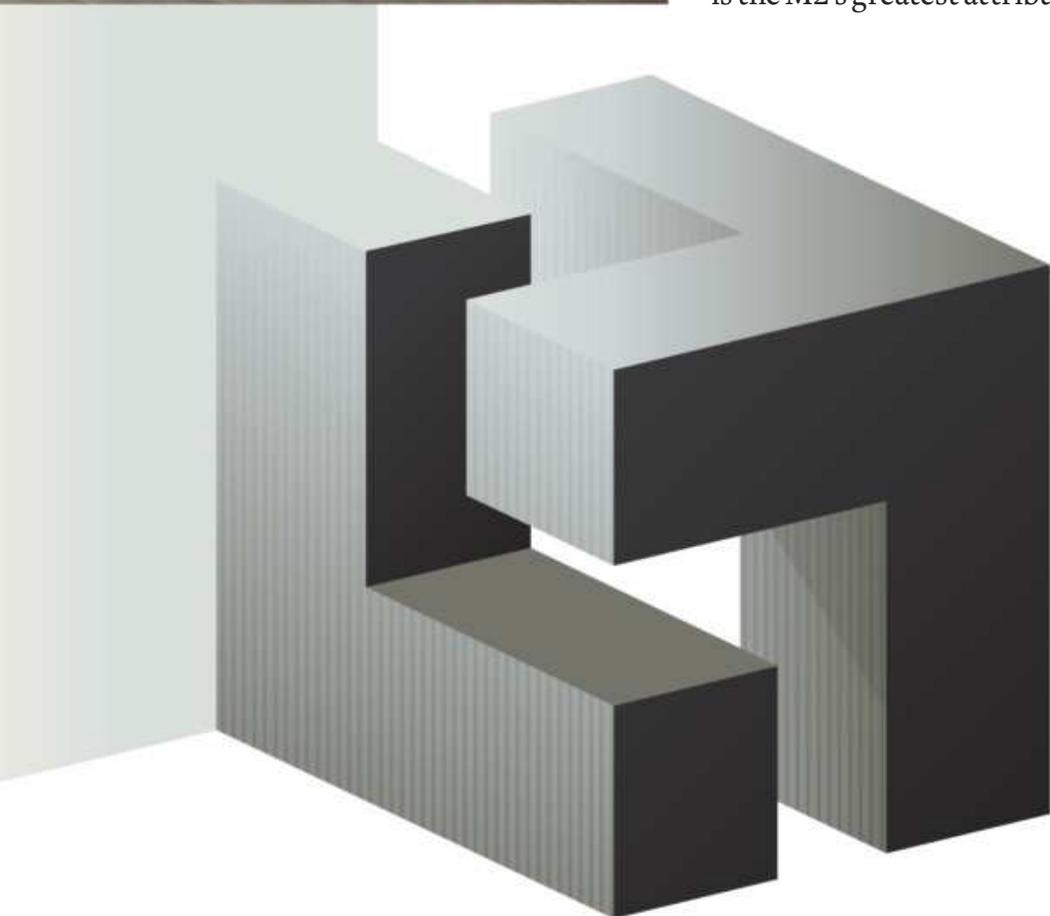
In the BMW universe of the past few years, the M2 is the rare unqualified success. The concept is pretty simple: Take the 2-series coupe, then add power and replace the suspension, brakes, and wheels with parts from the M4. But simple doesn't mean foolproof—the F80 M3 family is a testament to present-day BMW's ability to lose focus. Focus, however, is the M2's greatest attribute. We immediately fell in love with its balance, natural rear-drive dynamics, and potent and sonorous inline-six. Few staffers contested its spot on our 2017 10Best list.

There was a bit of a row when our long-term car showed up, though. We asked for a white M2 with the standard six-speed manual; we got a blue one with the seven-speed dual-clutch automatic. The manual car, we were told, was held up at the port. Faced with the decision between immediate gratification and waiting—it could be untold days!—we did what simple creatures do and said, "Okay." Then we took off sideways out of the parking lot, grinning like goldfish-brained idiots who'd already forgotten . . . something we were bothered by a few hundred feet back.

That didn't last long. Early-build M2s had differential woes that either cropped up soon after delivery or never. Break-in miles behind it, we took ours to the dealer and learned that it was one of the defective

Rants and Raves
The M2 displaces the M3 as the most desirable M car in my mind, a substantial shift.
—Dave VanderWerp

It's remarkable that some interior trim bits haven't rattled off. Did someone replace the dampers with steel rebar?
—David Beard





“COMPARED WITH THE FLOCK OF PERFECTLY AGREEABLE (AND UNINSPIRING) VEHICLES ON THE ROAD, THE SINGLE-MINDED LITTLE M2 MAKES FEWER FRIENDS BUT HAS MORE MEANINGFUL RELATIONSHIPS.”

—DANIEL PUND, DEPUTY EDITOR



ones. We had a leak and a half-shaft that was working its way out of engagement with the diff. The replacement required another round of break-in miles: We were getting so impatient to play with our new toy that we were practically dancing around like little kids who have to pee.

Finally at the track, the M2 screamed to 60 mph in 4.1 seconds and through the quarter-mile in 12.7 at 110 mph. It skittered around the skidpad at a full 1.00 g and ground to a stop from 70 mph in just 152 feet. Not bad for \$57,545.

Base price for our 2017 M2 was \$52,695. Aside from the \$2900 dual-clutch transmission, our only extra-cost items were the Long Beach Blue paint (\$550) and the Executive package: \$1400 for a rearview camera, parking sensors, automatic headlights, a heated steering wheel, and some other knickknacks.

The M2 was exceedingly cheap to keep around. After that initial 1200-mile checkup, we took it in for three other service appointments at intervals of around 12,000 miles for oil changes and inspections, with the 23,972-mile stop including a cabin air filter and the 35,676-mile service including a new engine air filter. All covered under BMW's complimentary scheduled maintenance, they totaled \$0. A nail poked a hole in the right-rear tire early on that cost \$20 to plug, our only tire-related expense—a minor miracle considering our usual luck with wheels and tires. The original Michelin Pilot Super Sports went the distance but were pretty worn by the end of the test. Michelin Pilot Alpin PA4s served winter duty, capably ushering the M2 through two Michigan winters. But they, too, were



We might quibble about its stiff ride, but the M2's hunkered-down, muscled body doesn't exactly suggest that it's a turnpike cruiser.



worn out after their 20,000 miles, with cupping that is visible from 10 feet away as they sit in our tire-storage racks, inexplicably taking up space there instead of in a fire somewhere.

A set of wiper blades at 26,281 miles cost \$49, and an alignment at 35,936 miles set us back \$190. And that was it. Well, aside from \$5200 in gas and the damage we did to the car. Luckily when we got rear-ended, there was another car between us and the errant Infiniti G35, a Ford Fusion that took the brunt of the hit. But the Infiniti shoved the Fusion into the M2, and a new bumper beam and cover, plus a parking sensor, ran \$2061. Then a scuffed front bumper—careful with those parking logs—and some paint repairs on the rear quarter-panel siphoned another \$1488 off the track-day fund.

And that is a shame, because few cars at this price are as fun or fulfilling when given the chance to cut loose. “The M2 is as wieldy as anything else on the market, with handling and responses superior to pretty much anything else this size,” read one early logbook entry. Shortly thereafter, the staff split into two utterly unmovable camps: one summed up by that com-

Rants & Raves

I still think I'd rather have an M240i. Its ride is much more compliant than the bouncy M2's, and it doesn't feel like it's always in attack mode.
—Joseph Capparella

BMW has proved to be the rare success story when it comes to preserving invigorating sound quality in the migration to turbocharged engines.
—Dave VanderWerp

I love to commute in this little brute. Great acceleration, and I love the seats, the comfort, the sound.
—Carolyn Pavia-Rauchman

Service Timeline: Living easy, living free.

Key: ● - Repair ● - Damage ● - Maintenance
● - Normal Wear ● - Oil Additions

January 23, 2017
94 miles: The BMW M2 begins its long-term test. We install Michelin Pilot Alpin PA4 winter tires (\$1101).

February 1, 2017
● 1159 miles: Dealer performs a four-wheel alignment and the 1200-mile oil change. During the inspection, dealer discovers a

leaking differential and replaces it under warranty, \$0

February 7, 2017
● 1368 miles: The right-rear tire is punctured, temporarily revived with sealant, and repaired the following day at the local tire shop, \$20

February 21, 2017
● 2911 miles: Dealer completes the “1200-mile” service on the replaced differential, swapping the fluid, \$0

April 21, 2017
6087 miles: We reinstall the Michelin Pilot Super Sport summer tires.

June 20, 2017
● 10,757 miles: Dealer performs an oil change and inspection under BMW's complimentary scheduled maintenance program, \$0

October 3, 2017
● 18,468 miles: A check-engine light illuminates. Dealer finds and clears a code for the ambient air

temperature being out of range, \$0

October 25, 2017
20,862 miles: We refit the winter tires.

November 27, 2017
● 23,972 miles: Dealer changes the oil, replaces the cabin air filter, and performs the usual inspection, \$0

January 4, 2018
● 26,281 miles: We replace the windshield-wiper blades, \$49

March 5, 2018
● 31,728 miles: Dealer repairs rear-end damage, \$2061

May 2, 2018
34,546 miles: We reinstall the summer tires.

JAN/17 FEB/17 MAR/17 APR/17 MAY/17 JUN/17 JUL/17 AUG/17 SEP/17 OCT/17 NOV/17 DEC/17



ment, the other lining up behind the guy who branded the M2 a “toxic compromise of everyday drivability.” Members of the latter group kept the logbook pages populated with references to the protean M240i and its more compliant ride and lower price.

They’re not wrong. Even the M2’s champions had a hard time ignoring its jarring ride, and the proliferation of squeaks and rattles suggest that maybe the M2 rides too stiffly even for itself. But as much as the M240i might better balance road and track competence, it fulfills neither of these missions as well as the M2 achieves its single purpose as a sporting machine. There’s a purity and consistency of intent and feel to the M that the rest of us very much appreciate. Its bulging fenders and gaping air intakes infuse the stubby 2-series body with attitude, a promise the car delivers on. Yes, the ride is brittle, but there are no harsh edges to the impacts, just a lot of body movement. The steering and brakes are both as weighty as the springs and dampers are stiff, but in that weight, there is precision and safety. As quick as this rack is, greater resistance is a welcome calming factor.

With that steering, the driver directs a tremendously responsive vehicle. The M2 changes direction as though it’s being electrocuted, but as long as the driver’s inputs

May 15, 2018

35,676 miles: Dealer changes the oil, replaces the engine air filter and spark plugs, applies felt tape to the rattling center brake light, and performs an inspection, \$0

May 17, 2018

35,936 miles: Dealer aligns all four wheels to address a pulling to the right, \$190

August 21, 2018

40,594 miles: Collision shop repairs front fascia and rear-quarter-panel damage, \$1488

August 28, 2018

40,600 miles: Long-term test ends.

OPERATING COSTS (FOR 40,000 MILES)

MAINTENANCE	\$0
NORMAL WEAR	\$49
REPAIR	\$190
GASOLINE (@ \$2.99 PER GALLON)	\$5200

DAMAGE AND DESTRUCTION \$3569

SERVICE

DEALER VISITS (SCHEDULED/UNSCHEDULED) ...	4/5
DAYS OUT OF SERVICE	12
UNSCHEDULED OIL ADDITIONS	0 qt





are smooth, its motions are controlled and economical. The car is happy to get out of control, too. There's enough power that full throttle anywhere in first or second gear will make the rear end squirm; apply that power without the wheel pointed dead ahead and you'll be sideways before your "yee haw!" is finished. But in the best BMW tradition, the slides are all in good fun and easy to rein in.

Even with its butch bodywork, though, the M2 is understated for its capabilities. It's nowhere near as extreme-looking as, say, the long-term Mustang Shelby GT350 with which it shared our parking lot. But in their initial tests, the BMW bettered the Ford to 60 mph by a tenth of a second and stopped a foot shorter from 70 mph, giving up just 0.02 g on the skidpad—this on tires that are two inches narrower up front and 1.6 inches skinnier out back than the Ford's. In our final testing, the M2 slipped a couple of tenths to 60 and couldn't quite match its first quarter-mile time. But a 2-mph increase in its trap speed exonerates the engine. Skidpad and braking performances were close enough to be attributable to the temperature/dew-point spread. On Venus.

The roads on Venus probably wouldn't be much better than they are in Michigan, so the M2 isn't likely to be much happier there. On a smooth road, though, the BMW M2 is a rare treat: ideally balanced and responsive, nimble without being twitchy, and powerful enough for whatever trouble you're looking to get into. This furious little coupe punches hard. It may not be a good Michigan car, but it is a great BMW.

The M2's interior isn't some sort of bedazzled jewel box. It is, instead, a sober and functional place to conduct the business of driving. We're good with that.



Rants & Raves

If all politicians were forced to drive M2s, our nation's roads would be fixed by next week. —Mark Quint

If the M2 must have an automatic-transmission option, then I don't begrudge the DCT, with its rapid-fire response to paddle shifts. So what if it's a little clumsy at low speed? —Dave VanderWerp

The dead pedal is really far off to the left. With a foot on the gas, my posture becomes that of a serious manspreader. —Annie White

This is a mean, nasty, little road-killing machine. It's not for the weak or frail. —C. Benn

There's a lot to like about the M2, but it should be a hatch. Full stop. —Jeff Sabatini

2017 BMW M2

\$57,545

PRICE AS TESTED \$57,545
BASE PRICE \$52,695

VEHICLE TYPE: front-engine, rear-wheel-drive, 4-passenger, 2-door coupe
ENGINE: turbocharged and intercooled DOHC 24-valve inline-6, aluminum block and head, direct fuel injection
DISPLACEMENT 182 cu in, 2979 cc
POWER 365 hp @ 6500 rpm
TORQUE 369 lb-ft @ 1450 rpm
TRANSMISSION 7-speed dual-clutch automatic with manual shifting mode

WHEELBASE 106.0 in
LENGTH 176.2 in
WIDTH 73.0 in
HEIGHT 55.5 in
CURB WEIGHT 3509 lb

WARRANTY

4 years/50,000 miles bumper to bumper
12 years/unlimited miles corrosion protection
4 years/unlimited miles roadside assistance
3 years/36,000 miles complimentary scheduled maintenance

MODEL-YEAR CHANGES

2018: BMW updates its infotainment system to iDrive 6.0 and makes minor exterior and interior styling changes.
2019: The 405-hp M2 Competition replaces the M2.

CAR AND DRIVER TEST RESULTS

PERFORMANCE

ZERO TO 60 MPH:
NEW 4.1 sec
40,000 4.3 sec

ZERO TO 100 MPH:
NEW 10.2 sec
40,000 9.9 sec

ZERO TO 150 MPH:
NEW 30.2 sec
40,000 28.7 sec

ROLLING START, 5-60 MPH:
NEW 4.5 sec
40,000 4.7 sec

1/4-MILE:
NEW 12.7 sec @ 110 mph
40,000 12.8 sec @ 112 mph

BRAKING, 70-0 MPH:
NEW 152 ft
40,000 156 ft

ROADHOLDING, 300-FT-DIA SKIDPAD:
NEW 1.00 g
40,000 0.99 g

TOP SPEED 163 mph (governor limited)

EPA FUEL ECONOMY, COMBINED/CITY/HWY 22/20/26 mpg
C/D-OBSERVED FUEL ECONOMY 23 mpg

LIFE EXPECTANCIES

(estimated from 40,000-mile test)

FRONT TIRES 40,000 miles
REAR TIRES 25,000 miles
FRONT BRAKE PADS more than 100,000 miles
REAR BRAKE PADS more than 100,000 miles

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OIL FILTER \$18
WHEEL (FRONT/REAR) \$1050/\$1150
TIRE (FRONT/REAR) \$270/\$319
WIPER BLADES (PAIR) \$59
FRONT BRAKE PADS \$278

FIVE-YEAR DEPRECIATION

Depreciation data from ALG. Based on 15,000 miles per year.



Fleet Files:

Here's how our other long-term vehicles are faring in their 40,000-mile trials:



▲ *Newcomer*

2019 INFINITI QX50 AWD

Arrival: Jul/2018

Miles: 4293 • Observed mpg: 21

NOT SINCE THE DAWN OF THE AUTOMOBILE has anyone messed with anything this fundamental to the internal-combustion engine. The addition of computer-controlled linkages between the crankshaft and the connecting rods makes the Infiniti QX50's four-cylinder the first mass-production engine capable of varying its compression ratio. We plan to find out if this hugely complex device can deliver a meaningful fuel-economy boost—see page 020 for more on that—but also to determine if the electronically controlled linkages can survive our leaden hooves.

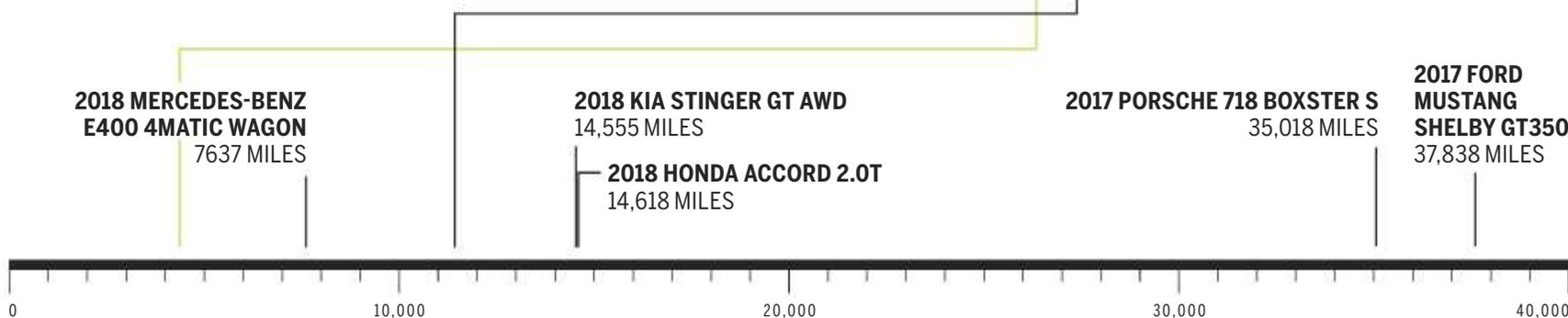
Our QX50 AWD wears the top-of-the-line Essential trim, which comes with leather seats, navigation, and the bird's-eye Around View Monitor for \$46,145. The \$7500 Sensory package includes 20-inch wheels, a power-tilting and -telescoping steering wheel, a motion-activated hatch, a 16-speaker Bose audio system, and heating and cooling for the front seats. White leather with blue synthetic-suede accents adds \$2000, and \$2550 surrounds our QX50 with nearly every active-safety tech shy of photon torpedoes. Welcome lighting and illuminated sill plates raise the total to \$59,085. But we'll mostly be paying attention to that engine. —*Jared Gall*

2018 Alfa Romeo Giulia Quadrifoglio

Arrival: Mar/2018

Miles: 11,415 • Observed mpg: 19

Our Giulia is so often in the custody of our local dealer that we're beginning to feel like divorced parents with limited visitation rights. For the long weeks between visits with our temperamental Quadrifoglio, we've been given a loaner Chrysler 300 to drive. We want to make a joke about this, but we just can't bring ourselves to. It started at 2900 miles with a warning to service the electronic throttle. After two separate trips to the shop, the Giulia eventually got a new fuel pump under warranty at 5040 miles. We piled on about 5000 more joyous, if nervous, miles before taking the car in for its routine 10,000-mile service (\$169). While at the dealership, we mentioned a whine we'd been hearing from the rear end. That precipitated a monthlong separation while the dealer waited for its sole Alfa tech to be freed up, waited for a new differential to arrive, and waited for that differential to be installed. We've since put a little more than 1000 miles on the car, which feels great, even transcendently awesome. But our faith has been betrayed. We still think about taking long trips with the Giulia, but as often as not, we choose a vehicle that has a statistically better chance of getting to our destination. Thanks to its raucous engine note, superb steering, quick-shifting automatic, and shockingly sophisticated ride quality, the Giulia QF is more emotionally engaging than any sedan you might care to mention. But that just makes the forced separations more emotionally taxing. Less wrenching, but more costly, were the replacements of a damaged right-front tire (\$275) and a stone-cracked windshield (\$1209). —*Daniel Pund* 🇺🇸





TESTED

King without a Crown

The redesigned Chevrolet **Silverado** is on a quest to own the pickup market. *—by Annie White*

▼ **THERE'S NO DISPUTING** the full-size pickup truck's place at the top of the vehicle-sales food chain. Together, Ford, General Motors, and Ram sold about 2.2 million of the things in the U.S. last year. Also-rans Nissan and Toyota added just shy of 170,000 more to that count, making it so that full-size trucks now account for almost 14 percent of the U.S. vehicle market. What is in dispute—and it's a hot dispute, one waged almost incessantly in TV commercials and on discourteous bumper stickers—is which truck is the best truck, King of Kings, Lord of the Contractor, Protector of the Suburban Man with Something to Prove.

With some 897,000 examples sold here in 2017, the Ford F-series holds the title for now. The Silverado's 586,000 sales may not look like much of a threat to Ford's numbers, but with the GMC Sierra's sales added in, that figure climbs to 804,000. And

[+] Improved ride, largest bed in class, increased tow ratings.
[-] Overwrought front-end styling, better ride is still not the best, rivals have plusher interiors.



wherever there's a crown to win, a challenger dreams of wearing it.

The new Silverado is bigger yet lighter than the outgoing model. The entry-level 4.3-liter V-6 is unchanged, but there are two new engines: a 3.0-liter turbo-diesel, coming early next year, and a 310-hp turbocharged 2.7-liter inline-four, due in showrooms in December. Both existing V-8s now feature Chevy's new Dynamic Fuel Management (DFM) technology,

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which improves on the Active Fuel Management (AFM) cylinder-deactivation system by employing 17 different firing modes and shutting down as many as six cylinders depending on the driver's demand for torque. DFM operates almost entirely under the radar, thanks to the efforts of development engineers who programmed parameters for each firing order to avoid unpleasant NVH. In our testing, the 5.3-liter eight-speed Silverado tied a similarly equipped 5.0-liter 10-speed F-150 at 16 mpg [see "Captain America: Civil War"]. A 5.7-liter Ram 1500 without the fancy eTorque 48-volt hybrid system achieved 14 mpg.

The Silverado's transmission lineup is now nearly as diverse as its engine roster. The standard 4.3-liter V-6 and the 5.3-liter V-8 with AFM still pair with a six-speed automatic, while the 5.3 equipped with the new DFM technology uses an eight-speed auto, as will the four-cylinder when it becomes available. The 6.2-liter and forthcoming 3.0-liter turbo-diesel come with a 10-speed automatic that GM shares with Ford. A single-speed transfer case is the new standard for all-wheel-drive models, though the truck's available Z71 Off-Road package—standard on Trail Boss models—adds back a low range. Every all-wheel-drive Silverado now has push-button electronic controls to manage the system (some base and near-base models used to have floor-mounted shifters for this purpose).

One of the chief criticisms of the outgoing truck was that it looked too much like its predecessor, to the extent that even the truck-savvy couldn't tell the two apart. Perhaps Chevy had taken the whole "if it ain't broke, don't fix it" thing a little too far. So Chevy stamps the new truck's sheetmetal with sleeker lines in the hood and around the wheel wells, and a multi-level headlight array modernizes the Sil-

verado's face. We're not sure Chevy nailed it this time, either; at a traffic light, one fellow motorist leaned out his window to call the Silverado feminine—well, okay, that wasn't the word he used.

Non-cosmetic tweaks to the exterior had a more positive effect. Chevy claims short-bed variants of the V-8 Silverado lose 450 pounds compared with the last generation, largely due to a new manufacturing strategy that allows GM to construct the body and frame from several different grades of steel and the doors, hood, and tailgate from aluminum. Varying the thickness of steel over different parts of the frame makes the Silverado lighter without relying on an expensive aluminum-intensive construction, as Ford does. Payload and tow ratings are up by a few

tale of the tape

CAPTAIN AMERICA: CIVIL WAR

- 2019 Chevrolet Silverado RST 4WD (5.3-L V-8, 8-speed auto, crew cab, short bed, 3.42:1 axle)
- 2018 Ford F-150 Platinum 4x4 (5.0-L V-8, 10-speed auto, crew cab, short bed, 3.31:1 axle)
- 2019 Ram 1500 Laramie 4x4 (5.7-L V-8, 8-speed auto, crew cab, short bed, 3.21:1 axle)

WEIGHT



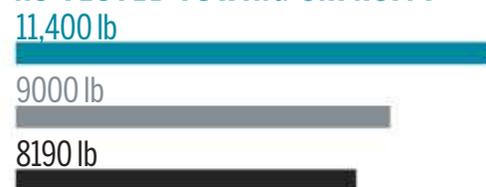
C/D OBSERVED MPG



ZERO TO 60 MPH



AS-TESTED TOWING CAPACITY



1/4-MILE



AS-TESTED PAYLOAD CAPACITY





hundred pounds for some models, and the Silverado's new bed is constructed in three pieces, which allows the wheel wells to be stamped differently, increasing cargo volume to 63 cubic feet in short-bed models. Compare that with the Ram 1500's bed at 54 cubic feet and the F-150's at 53 cubic feet, and things are starting to look good for Chevy's usurper.

Those numbers are big news for the contractors and weekend warriors who rely on their trucks to get big jobs done, but plenty of truck owners treat their workhorses more like show ponies. So Chevrolet aimed to build a truck that would ride well even when it's unladen, and during our initial drive on Wyoming's well-maintained roads, the Silverado seemed to fulfill that goal. It recovers quickly from small bumps, the steering is well weighted and accurate with no dead zones, and overall it feels surprisingly agile on meandering mountain passes. In Michigan, though, the 5.3-liter all-wheel-drive crew cab we tested occasionally became unsettled over blighted roadways, especially when traveling at freeway speeds.

One point for the Midwest, though: While climbing the foothills around Wyoming's Tetons above 6000 feet, the 355-hp 5.3-liter failed to express its full power, and the eight-speed automatic sometimes lagged when going uphill at part throttle, downshifting several seconds after a human would have. Back in our flatland home, however, our RST model sprang to 60 mph in 6.1 seconds. That's a respectable pace even for a vehicle that doesn't weigh two and a half tons, but it's not enough for a victory in the truck wars.

The RST trim level is new for 2019 and

2019 CHEVROLET SILVERADO 1500 RST 4WD CREW

VEHICLE TYPE: front-engine, rear-/all-wheel-drive, 5-passenger, 4-door pickup

PRICE AS TESTED: \$56,875

BASE PRICE: \$45,995

ENGINE: pushrod 16-valve V-8, direct fuel injection

DISPLACEMENT: 325 cu in, 5327 cc

POWER: 355 hp @ 5600 rpm

TORQUE: 383 lb-ft @ 4100 rpm

TRANSMISSION: 8-speed automatic with manual shifting mode

DIMENSIONS

WHEELBASE: 147.4 in

LENGTH: 231.7 in

WIDTH: 81.2 in

HEIGHT: 75.5 in

PASSENGER VOLUME: 139 cu ft

CURB WEIGHT: 5226 lb

C/D TEST RESULTS

ZERO TO 60 MPH: 6.1 sec

ROLLING START, 5-60 MPH: 6.5 sec

1/4-MILE: 14.7 sec @ 95 mph

TOP SPEED: 98 mph (governor limited)

BRAKING, 70-0 MPH: 186 ft

ROADHOLDING, 300-FT-DIA

SKIDPAD: 0.78 g

FUEL ECONOMY

EPA COMBINED/CITY/HWY: 18/16/22 mpg

C/D OBSERVED: 16 mpg

is essentially a performance-appearance package with black bow-tie badges; LED head-, fog-, and taillights; and body-colored moldings in place of the showy chrome that adorns LTZ and High Country models. Starting at \$45,995, an all-wheel-drive crew-cab RST leaves a lot of amenities on the table. Our example included options such as dual-zone climate control; heated front seats and steering wheel; two USB ports in the second row; a trailering package with a beefier rear axle, a radiator with more cooling capacity, and revised shock tuning; and active-safety items, such as front and rear parking sensors and blind-spot monitoring. The 5.3-liter was also an upgrade over the turbocharged 2.7-liter four, which will be the standard offering in the RST trim.

Our \$56,875 truck felt like anything but a bargain, with interior trim materials that fail to justify such a price tag. Even High Country models leave something to be desired. This may be to make room in the General's quiver for the Sierra or to maximize an already massive profit margin; whatever the case, when it comes to interiors, Ford and Ram outclass Chevy.

Between the diet, the DFM system, and the forthcoming diesel and four-cylinder engines, the Silverado is on track to match the F-150's fuel economy, and GM expects to undercut Ford in manufacturing costs. The Silverado may not be quicker or more comfortable than the F-150, but its bigger bed and increased tow ratings will make some customers notice. And if it's able to make more money from each sale than Ford can, GM may be wearing the crown even if the Silverado doesn't sit on the sales throne.

Opposite: Unlike previous GM trucks, this one's steering wheel aligns with the driver's seat. Above left: Rear-seat hidey-holes are optional.

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Matryoshka Doll

Audi makes a true luxury SUV, size Small. It's the all-new subcompact **Q3**. *—by David Beard*

▼ **IT'S EASY TO GET LOST** in the spectacular views of northern Italy's Alpine region. The jagged peaks of the Dolomites jutting up from the earth, the crystal-clear lakes filling the valleys, and the lush green hillsides are overwhelming. It should be easy, ascending and descending the never-ending switchbacks, to erase memories of the uninspiring first-generation Audi Q3. But it's not.

Introduced in 2011 for other markets, the Q3 made its way to the U.S. for the 2015 model year to establish Audi's presence in the booming luxury-subcompact market. But it was underpinned by a prehistoric platform, its interior could have been dated by radio-carbon, and its styling was as bland as Kansas Thai food. The second-generation Q3 starts with a clean sheet. Crack open the Audi Q8, split the Q7's shell, and pull apart the Q5, and you'll eventually work your way down to the 2019 Q3, which replaces the soft, dumpling-like look of its predecessor with a version of the octagonal grille and taut body lines that make up Audi's current upright, aggressive design language. Each of the two trim levels features a unique fascia. The base model's nose is subdued, while the S line's larger faux air intakes and chiseled splitter present a far less benign face. Full-LED lights at all four corners are standard equipment. If you like the contrasting black wheel arches and rocker sills, as we do, you're out of luck. On U.S.-market vehicles, those pieces will be matched to the body color.

2019 AUDI Q3

VEHICLE TYPE: front-engine, all-wheel-drive, 5-passenger, 4-door hatchback

BASE PRICE: \$37,000 (est)

ENGINES: turbocharged and intercooled DOHC 16-valve 2.0-liter inline-4, 184 or 228 hp, 236 or 258 lb-ft

TRANSMISSION: 8-speed automatic with manual shifting mode

DIMENSIONS

WHEELBASE: 105.5 in

LENGTH: 176.5 in

WIDTH: 73.1 in

HEIGHT: 63.6 in

CARGO VOLUME: 19 cu ft

CURB WEIGHT: 3800 lb

PERFORMANCE

(C/D EST)

ZERO TO 60 MPH: 7.6–8.5 sec

ZERO TO 100 MPH: 22.0–24.5 sec

1/4-MILE: 15.2–16.5 sec

TOP SPEED: 130 mph

FUEL ECONOMY

EPA COMBINED/CITY/HWY: 23–24/21–22/27–28 mpg (C/D est)

The more important changes are the structural and mechanical ones. The Volkswagen Group's versatile MQB architecture replaces the dated PQ35 platform, and the Q3 grows in every dimension, approaching Q5 territory. At 176.5 inches overall, it is 3.7 inches longer than the outgoing Q3 and just 7.1 inches shy of the Q5. Much of that growth—three inches—occurs between the wheel centers, stretching the wheelbase to 105.5 inches. Width pushes out by an inch and height increases by the same margin.

A turbocharged 2.0-liter inline-four offers two output levels, straddling the previous 200-hp four's. Both versions of the engine provide more torque earlier in the rev range than the old mill. A 184-hp variant motivates base models, producing 236 pound-feet of torque. We sampled only the higher-output version, good for 228 horsepower and 258 pound-feet, mated to a seven-speed dual-clutch transmission. There's a moment of lag at initial tip-in, but once rolling, the Q3 is sufficiently quick for

a small SUV. Here in the States, an eight-speed automatic, which we did not drive, will be the only transmission offered.

All-wheel drive is standard on every model, and there will be no front-drive version. The Quattro hardware carries over from the outgoing Q3, though minor software tweaks improve efficiency, allowing the system to decouple the rear axle via an electronically controlled clutch pack and operate as a front-driver in certain situations.

To cut costs, Audi will offer only the regular suspension in the U.S., forgoing the Sport and adaptive-damper packages available overseas. Over northern Italy's buttery-smooth roads, the busy ride of the last Q3 is absent, due in part to the longer wheelbase. Just the harshest impacts, such as thwacking an exposed manhole cover, reverberate through the cabin. We drove only Q3s equipped with 20-inch wheels wrapped in large 255-millimeter summer rubber and expect the smaller 18- and 19-inch wheel offerings to return even smoother rides. Though the steering effort is feather light and feedback is muffled, inputs through the steering wheel are translated with urgency, the Q3 changing direction gracefully and with minimal body roll. The brakes are much better, too. Gone is the old softness; in its place is a firm, progressive pedal that allows easy modulation.

The Q3's interior is well sorted and has the most modern feel in the segment. Leather is standard, and the seating position is vastly improved, with an airy greenhouse and a panoramic sunroof. Synthetic suede divides the dash horizontally (it's also available on the armrests). A 10.3-inch digital gauge



[+] Improved ride, roomy back seat, usable and attractive infotainment.
[-] No dual-clutch in the U.S.; feather-weight, feel-free steering.

cluster is standard, and Audi's 12.2-inch Virtual Cockpit configurable instrument panel is optional. An 8.8-inch dash-mounted infotainment display is also included, and a 10.1-inch screen is available. This is the first use of the brand's haptic touchscreen in a single-display application, as opposed to the two-screen approach that's used in larger Audis. The system responds rapidly and renders the backup camera and available bird's-eye view in high resolution. The presence of analog HVAC controls in the new Q3 is a welcome change over Audi's ostensibly more advanced two-touchscreen setup. Both control systems are angled toward the driver by 10 degrees.

When the Q3 finally makes it to the U.S. in the middle of next year, it will not be offered with the cloth seats seen on this Europe-market car.

That longer wheelbase is a boon for interior real estate. The rear seats offer an adjustable recline function and 5.9 inches of fore and aft movement, providing ample space for adults of all sizes. The cargo hold grows two cubes over the previous generation's, to 19 cubic feet. Of course, all manner of electronic-driver-assistance systems are available, including standard automated emergency braking.

Audi hasn't announced pricing yet, but we expect the Q3 to remain competitive within the segment; figure about \$37,000 when it hits dealerships late next summer or early fall. It comes with enough standard equipment to credibly call itself an entry-level-luxury crossover, and it is a significant improvement over the ute it replaces. In time, we hope to forget all about that one.





Honey Badger

Lexus's new **UX** is more than a dressed-up Toyota hatch. *—by Joseph Capparella*

▼ **THE CHEVY CAVALIER-BASED** Cadillac Cimarron has been the butt of jokes for decades, but now even Audi, BMW, and Mercedes-Benz are not above slapping their badges on front-wheel-drive compacts.

Lexus tried and failed once at the entry-level-luxury game because no one wanted the mildly luxed-up Prius that was the CT200h hatchback. But now it seems everyone wants crossovers, so that's what Lexus's new starter model is. The UX is still a Toyota underneath, largely using the same underpinnings as the C-HR and the same base powertrain as the Corolla hatchback, but it wears the bejeweled crossover mask with conviction.

The UX slots in below the NX, being some five inches shorter, four inches lower, and one inch narrower. That means it's about the same size as the Audi Q3, the BMW X1, and the Mercedes-Benz GLA, but because the larger NX effectively competes with those cars, too, Lexus insists that price is the differentiator. The UX starts at \$33,025, undercutting the NX by more than \$4,000 and offering more standard features than the Germans, which come sparsely equipped in their base forms.

Even though it's being pitched as a bargain, the UX does a good job matching the luxury quotient of its big siblings. An attractive mix of materials inside includes expensive-feeling plastics, soft faux leather, and an interesting trim piece along the dashboard that's meant to evoke the grain of *washi*, a traditional Japanese paper. Unfortunately, the frustrating infotainment touchpad carries over from other Lexus models, too.

Lexus has also applied an inordinate number of extreme styling cues [see "A Whirl of Wind"], perhaps to ensure that the hatch won't be mistaken for a Toyota. And if the UX is a commuter car underneath its wild skin, at least it's a pretty good commuter car. We continue to be

impressed with the dynamic qualities of Toyota's new platforms, and the UX has progressive steering, nicely tuned damping, and real chassis refinement.

The powertrains are less cultured. The front-wheel-drive-only UX200's 169-hp 2.0-liter inline-four sounds coarse at higher revs, and while the CVT it pairs with works well enough, this combo has nothing on the German mini crossovers' potent turbo fours. The UX250h's 175-hp hybrid powertrain uses three electric motors, including a 7-hp unit that drives the rear wheels up to 43 mph. Although both powertrains feel as if they come from economy cars, they also deliver legitimate economy-car fuel efficiency, ranging from 33 to 38 mpg combined per Toyota's estimates. The outgoing Q3 hits only 23 mpg; the X1 tops out at 26, and the GLA, 27.

It's tempting to deride Lexus for pandering to badge snobs with a vehicle that's effectively a dressed-up econobox. But the UX is mostly convincing in its impersonation of a premium product thanks to its plush interior, agreeable demeanor, and, yes, even its polarizing looks.

[+] Convincingly upscale inside, pleasant ride quality, good value.
[-] Econocar powertrains, annoying infotainment system.

2019 LEXUS UX

VEHICLE TYPE: front-engine, front- or all-wheel-drive, 5-passenger, 4-door hatchback

BASE PRICE: \$33,025–\$35,025

POWERTRAIN: DOHC 16-valve 2.0-liter inline-4, 169 hp, 151 lb-ft; DOHC 16-valve 2.0-liter Atkinson-cycle inline-4, 143 hp, 133 lb-ft + 3 AC motors; combined system, 175 hp; 1.4-kWh nickel-metal-hydride battery

TRANSMISSIONS: continuously variable automatic with 1 fixed ratio and manual shifting mode, continuously variable automatic with manual shifting mode

DIMENSIONS

WHEELBASE: 103.9 in

LENGTH: 177.0 in

WIDTH: 72.4 in

HEIGHT: 60.6 in

PASSENGER VOLUME: 87 cu ft

CARGO VOLUME: 17–22 cu ft

CURB WEIGHT: 3300–3600 lb

PERFORMANCE (C/D EST)

ZERO TO 60 MPH: 8.6–8.9 sec

ZERO TO 100 MPH: 24.0–24.5 sec

1/4-MILE: 16.5–17.0 sec

TOP SPEED: 110–118 mph

FUEL ECONOMY

EPA COMBINED/CITY/HWY: 33–38/32–40/35–36 mpg (C/D est)

tech highlight

A WHIRL OF WIND

The UX's many creases and protrusions might not be pleasing to the eye, but they are pleasing to the air. Lexus says that both the strangely shaped wheel-arch moldings and the fins on the edges of the taillights are aerodynamically functional, the former reducing turbulence and lift and the latter improving crosswind stability by quelling air-pressure changes at the rear corners by about 16 percent.



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No Legacy Required

BMW's latest **X5** is possibly the brand's best SUV yet. *—by Joseph Capparella*

▼ **UNLIKE BMW'S SPORTS** sedans, its SUVs have no revered progenitors, no E39 or E46 to engender nostalgia and unfair comparisons. The X5 has always been competent and commercially successful, but it's never really been exalted. So BMW doesn't have to launch the fourth generation of its mid-size SUV with the promise that the company is getting back on track, as it's doing with the impending 3-series [see "The Third Degree," page 015]. Instead, the Bavarians are perfectly content to prove that this X5 is simply a better, more capable, and more advanced version of the last X5. And that's exactly what it is.

Slightly larger than before in terms of wheelbase, width, and length, the new X5's proportions are eminently familiar, even if its kidney grille has grown to near-comical proportions. Its skin is pulled tauter over the corners and the side surfacing adds a bit of interest with a line that kicks up at the rear door, making it look more athletic, but it's far from revolutionary.

There's a fair amount of novel stuff going on underneath, however. BMW is migrating its entire lineup to just two modular platforms, and the X5 is the latest to switch to the so-called CLAR (Cluster Architecture) that also underpins the

[+] Sweet inline-six, elegant cabin, capable chassis.
[-] Overly familiar looks, lots of costly options.

new 3-series. Its double-wishbone front suspension and multilink rear are complemented by newly standard adaptive dampers and an optional suspension that now brings air springs to the front in addition to the rear axle; they were only available out back previously. Rear-wheel steering is a new offering, and some of the last X5's options—including active anti-roll bars, variable-ratio steering, and an electronically controlled limited-slip rear differential—continue on here.

This vast array of chassis tech is all part of BMW's assertion that the new X5 both handles better on-road and is more capable off-road. We can't dispute this claim after experiencing the new X5 on a legitimately challenging off-road course as well as on some twisty two-lanes around Atlanta. It's impressive in the dirt, with all the requisite systems, including standard hill-descent control, making it easy to crawl down rocks—despite the fact that even when fitted with the new Off-Road package, the examples we drove wore decidedly street-biased Pirelli P Zero summer tires.

2019 BMW X5

VEHICLE TYPE: front-engine, all-wheel-drive, 5- or 7-passenger, 4-door hatchback

BASE PRICE: \$61,695–\$76,745

ENGINES: turbocharged and intercooled DOHC 24-valve 3.0-liter inline-6, 335 hp, 330 lb-ft; twin-turbocharged and intercooled DOHC 32-valve 4.4-liter V-8, 456 hp, 479 lb-ft

TRANSMISSION: 8-speed automatic with manual shifting mode

DIMENSIONS
WHEELBASE: 117.1 in
LENGTH: 194.3 in
WIDTH: 78.9 in
HEIGHT: 69.0 in
PASSENGER VOLUME: 105–133 cu ft

CURB WEIGHT: 5000–5300 lb
PERFORMANCE (C/D EST)

ZERO TO 60 MPH: 4.3–5.5 sec
ZERO TO 100 MPH: 10.6–15.4 sec
1/4-MILE: 12.7–14.2 sec
TOP SPEED: 130–155 mph
FUEL ECONOMY
EPA COMBINED/CITY/HWY: 19–22/17–20/22–26 mpg (mfr's est)



More relevant are the X5's road manners, which improve on the old model's clunky ride and loose steering with a more connected feel and a greater sense of refinement. The primary controls are still somewhat aloof—a tall, two-and-a-half-ton SUV is never going to provide the sharp responses of a sports sedan, and we don't expect it to—but there's little slop in the steering and the brake pedal responds progressively to inputs. The X5 is also supremely quiet, confidently settling into a stable highway cruise with barely any wind or road noise permeating the cabin. You might hear a hint of the xDrive40i model's sweet-singing inline-six under hard acceleration, but the engine note is hushed, too.

This 335-hp turbocharged 3.0-liter mill is familiar from elsewhere in the BMW lineup, and it works as beautifully in the X5 as it does in other Bimmers. Shifts from the ZF eight-speed automatic are snappy, and the engine is so smooth, satisfying, and potent throughout the rev range that the 456-hp twin-turbo V-8 xDrive50i, which we did not drive, seems like overkill. The xDrive designations should tell you that all-wheel drive is standard, though a rear-drive price leader will likely join the lineup later, along with diesel and plug-in-hybrid versions.

backing out

BREAD CRUMBS

If you managed to fit your X5 into a tight parking space or garage but can't seem to find your way out, BMW has engineered a solution. Called Back-Up Assistant, this system, once activated, can track a forward maneuver for up to 165 feet, remember it, and then steer the car on the same path in reverse.

The fully loaded six-cylinder X5 we drove, at a steep as-tested price of more than \$80,000, boasted one of the nicest BMW interiors in recent memory. While the upright seating position of all previous X5s is still in effect, the dashboard is a refreshing break from tradition. Knurled knobs, modernized climate-control buttons, and shiny bits of trim bring more flair than we're used to finding in BMW's dour, businesslike cabins. Optional finishes, such as a leather-wrapped dash, glass controls, and no-cost open-pore wood, class things up to a level that nearly matches the Volvo XC90's cabin, the segment's current posh interior of note. The X5's instrument cluster is fully digital, and it and the 12.3-inch central display boast new software with crisp, clear graphics and easy-to-understand menu structures accessed via the familiar iDrive controller.

The larger exterior footprint provides more space inside, but unlike some competitors, the X5 is not really intended to be a seven-passenger family hauler. The upcoming X7, which will come standard with three rows of seats, will cover that base. The X5's third row is optional, and while its second row remains quite accommodating, the sixth and seventh seats look to be, as they were before, for kids only. Other nods toward practicality include an optional power-operated cargo cover and the X5's familiar two-piece tailgate, the bottom section of which is now powered just like the upper section.

With its array of mechanical and technological upgrades [see "Bread Crumbs"], the new X5 will convince even the most steadfast doubters of its superiority over the X5s that have come before it. As an SUV, it isn't going to garner the sort of following that ranks its G05 code name among the Bavarian legends, but this is the most accomplished BMW SUV yet, and it wears its many different hats with aplomb.

The new X5's skin is taut and handsome. Its kidneys are so absurdly enlarged, though, that we fear they're not draining fluid properly.



Big Mac Jr.

McLaren returns to the track with the new **600LT**, mixing a taste of halo car into its dollar menu. *—by Eric Tingwall*

▼ **McLAREN PRODUCT DEVELOPMENT** moves with the efficiency of a fast-food chain stacking beef patties, buns, and cheese into a dozen different menu items. Working from a stock of carbon-fiber tubs, twin-turbo V-8s, and seven-speed dual-clutch gearboxes, the Brits churn out new supercars as if they're seasonal fare. And despite the architectural similarity, each model has just enough tweaked ingredients to make it stand apart from the others. The new \$242,500 600LT gives drivers a taste of the range-topping Senna's intensity in a smaller serving at a quarter of the price.

Derived from McLaren's entry offering, this so-called Longtail adds 1.9 inches to the rump and 1.1 inches to the nose of

[+] Time-stopping brakes; a furious pace or tail-out antics—your choice.
[-] Low-speed transmission jerkiness, too much collagen in that upper lip.

the 570S coupe. The geometry is secondary to the philosophy, though. The LT recipe modifies the 570S for less weight, more power, improved aerodynamics, and greater driver engagement, all in the interest of track duty and with the added flair of limited production.

McLaren says it cut 220 pounds out of the 570S, which should land the 600LT just below 3000 pounds. That's if you're willing to skip the A/C, the stereo, and the nav system and spring for the Senna's \$6060 carbon-shell seats. Each 600LT gets the

top-exit exhaust, which weighs 28 pounds less than the 570S's pipes. That also clears space for a taller rear diffuser that works in conjunction with a splitter and a fixed rear wing to generate 220 pounds of downforce at 155 mph. To ensure that the 592-hp 3.8-liter V-8 (up 30 horses over the 570S) doesn't broil the carbon fiber, the wing's center section is wrapped with a thermal coating.

Forged control arms from the 720S deliver more toe control in the rear, increasing stability in corners and under braking. But the 570S's wild side still lurks at the edge of grip. Under trail braking, you can coach the 600LT's rear end to turn in even more eagerly than the front axle. Uncork the turbos early in a corner and the Pirelli P Zero Trofeo R tires break away in a graceful, progressive slide. Tidy and precise

2019 McLaren 600LT

VEHICLE TYPE: mid-engine, rear-wheel-drive, 2-passenger, 2-door coupe
BASE PRICE: \$242,500
ENGINE: twin-turbocharged and intercooled DOHC 32-valve V-8, aluminum block and heads, port fuel injection
DISPLACEMENT: 232 cu in, 3799 cc
POWER: 592 hp @ 7500 rpm
TORQUE: 457 lb-ft @ 5500 rpm
TRANSMISSION: 7-speed dual-clutch automatic with manual shifting mode
DIMENSIONS
WHEELBASE: 105.1 in
LENGTH: 181.3 in
WIDTH: 76.0 in
HEIGHT: 47.0 in
PASSENGER VOLUME: 49 cu ft
CARGO VOLUME: 5 cu ft
CURB WEIGHT: 3000 lb
PERFORMANCE (C/D EST)
ZERO TO 60 MPH: 2.8 sec
ZERO TO 100 MPH: 6.0 sec
1/4-MILE: 10.5 sec
TOP SPEED: 204 mph
FUEL ECONOMY
EPA COMBINED/CITY/HWY: 18/15/23 mpg (mfr's est)

when treated respectfully, the 600LT turns rowdy when driven with teenage aggression.

The 600LT rides on steel springs, electronically controlled dampers, and conventional anti-roll bars. This setup can't match the bandwidth and suppleness of the Proactive Chassis Control II system, which hydraulically links the dampers at each corner of McLaren's more expensive cars. Still, there's just enough compliance to bash track curbing without unsettling the car's fine balance. Use the 600LT on the track as intended, rather than as a Soho House codpiece, and the firm ride will feel perfectly dialed in.

The seven-speed transmission occasionally balks and jerks while pattering around the paddock. Keep the speed up, though, and the gearchanges snap. As in all modern McLarens, the V-8 trades torque for a dramatic windup. The high-pitched shriek and frantic rush to the 7500-rpm power peak give this engine a character that's closer to a superbike's than that of an AMG twin-turbo V-8 bruiser.

Stand on the brake pedal and the 600LT evokes both McLaren's \$960,000 halo car and the Almighty. Taking inspiration from the Senna, engineers fed the booster with an electric vacuum pump for consistent response and feel. Calipers from the 720S, lighter than those in the 570S, bite into the standard carbon-ceramic discs. The sum of the Longtail's parts is tireless performance, easy modulation, and telegraphic feedback. That's a fitting synopsis of both the brakes and the car as a whole. We're lovin' it.



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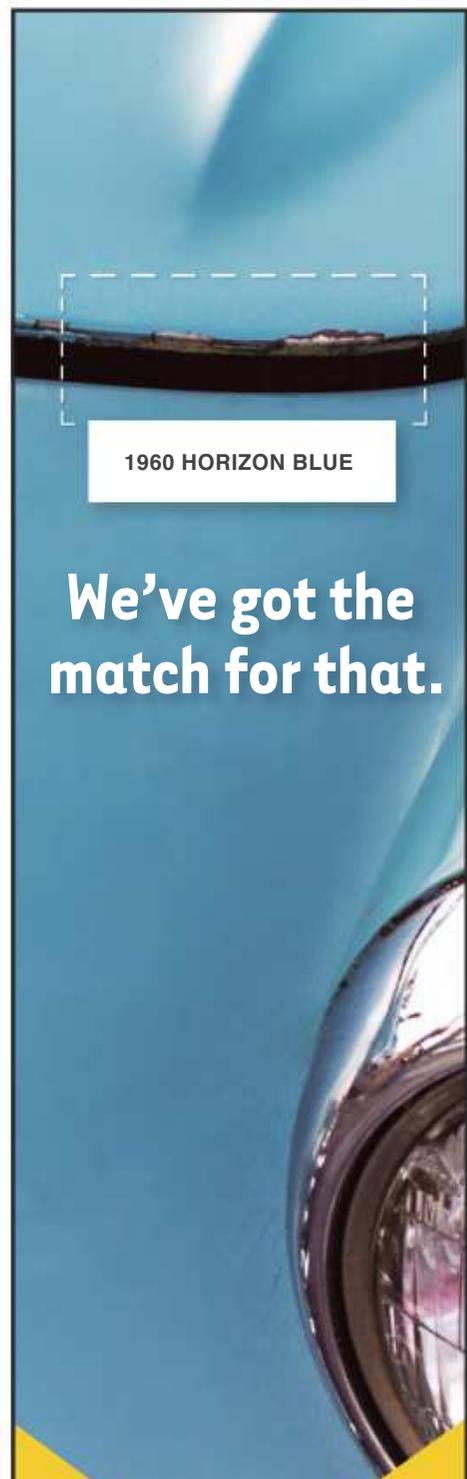


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Short, Not Sport

For its redesign, the Hyundai **Santa Fe** drops the Sport from its name. It's about time. *—by Joe Lorio*

▼ **THERE ARE SO MANY.** Hyundai just gave us another. Good-enough two-row crossovers, that is. For 2019, Hyundai's Santa Fe Sport becomes just plain Santa Fe, while the longer, three-row Santa Fe adds the suffix XL. To go with its shorter name, the standard-size model gets a redesign (the XL gets its turn next year), with squinty daytime running lamps and a grille that might have been fashioned from egg cartons. The Santa Fe grows 2.6 inches in wheelbase and 2.8 inches in length, yet Hyundai claims that the base model is lighter than the Sport it replaces. Plus, what this ute lacks in dynamic fireworks, it makes up in space, practical operation, and newfound good looks. And let's not forget that 10-year/100,000-mile powertrain warranty. This is the safe choice if there ever was one.

[+] Quiet and composed ride, long list of standard safety features, roomy interior.
[-] Mediocre fuel economy, turbo engine reserved for top trims, nothing-special driving experience.

Inside, there are roomy accommodations for five, with a spacious rear seat accessed via wide door openings. Up front, there's lots of elbowroom, cabin stowage is plentiful, and thin A-pillars and door-mounted side mirrors aid visibility. The apex of the five-trim lineup, the Ultimate, boasts an 8.0-inch touchscreen infotainment system and a multifunction display within the instrument cluster. Lesser models get a conventional 7.0-inch screen.

It's a practical interior, but the design and materials of even the top trim aren't anything to keep Audi up at night.

All models come standard with a 185-hp 2.4-liter inline-four, and the top two trims can be had with a turbocharged 2.0-liter four-cylinder good for 235 horsepower and 260 pound-feet of torque. (A 2.2-liter turbo-diesel arrives next year.) All-wheel drive is available with either engine, and each uses an eight-speed automatic, replacing the Sport's six-speed unit. Despite the additional ratios, fuel economy barely budges. According to the EPA, the

2019 HYUNDAI SANTA FE

VEHICLE TYPE: front-engine, front- or all-wheel-drive, 5-passenger, 4-door hatchback
BASE PRICE: \$26,480–\$36,880
ENGINES: DOHC 16-valve 2.4-liter inline-4, 185 hp, 178 lb-ft; turbocharged and intercooled DOHC 16-valve 2.0-liter inline-4, 235 hp, 260 lb-ft
TRANSMISSION: 8-speed automatic with manual shifting mode
DIMENSIONS
WHEELBASE: 108.9 in
LENGTH: 187.8 in
WIDTH: 74.4 in
HEIGHT: 66.1 in
PASSENGER VOLUME: 116 cu ft
CARGO VOLUME: 36 cu ft
CURB WEIGHT: 3600–4100 lb
PERFORMANCE (C/D EST)
ZERO TO 60 MPH: 7.4–8.0 sec
ZERO TO 100 MPH: 20.2–21.5 sec
1/4-MILE: 15.6–16.3 sec
TOP SPEED: 130 mph
FUEL ECONOMY
EPA COMBINED/CITY/HWY: 21–25/19–22/24–29 mpg

base-engine Santa Fe doesn't go as far on a gallon of unleaded as a 2.4-liter Jeep Cherokee or a 2.5-liter Subaru Outback can. Comparing turbo 2.0-liters, the Hyundai trails the Cherokee and the Ford Edge.

Our drive in the 2.0-liter, all-wheel-drive model started in Park City, Utah, at roughly 7000 feet above sea level. In that meager atmosphere, the turbo's off-the-line acceleration was languid, but its on-the-move response was better, and the transmission's shifts were smooth and well timed. We had only a brief go with the 2.4-liter, and it, too, was enervated by the thin mountain air. It also exhibited some coarseness at higher revs, where it spent considerable time. Aside from the strains of the 2.4-liter, the Santa Fe was extremely quiet, and its structure felt solid even over washboard dirt roads. The suspension has repositioned dampers with revised valving and redesigned bushings, and it delivers a composed ride with minimal body roll. There's nothing sporty here, but its steering is quicker than before, nicely weighted, and confidence inspiring.

Crossover shoppers will care more about the catalog of safety features: Forward-collision warning with pedestrian detection, automated emergency braking, lane-keeping assist, blind-spot monitoring, rear-cross-traffic alert, and adaptive cruise control with stop-and-go capability are all standard. Long on features and room, short on thrills, the pragmatic Santa Fe strikes a rare note of marketing honesty in jettisoning the Sport label. ■



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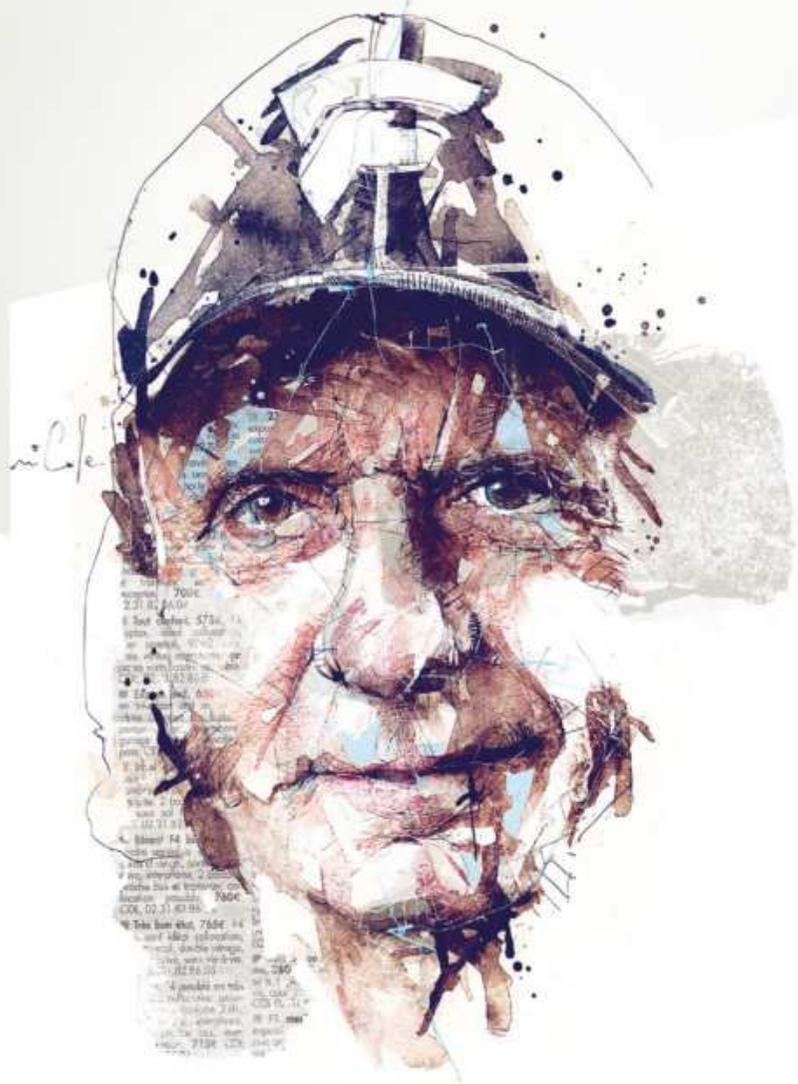


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What I'd Do Differently Emerson Fittipaldi, 71

The double world champion and two-time Indy 500 winner tells us about surviving Formula 1's darkest era, his love of short ovals, and his trademark sideburns.

► interview by MIKE DUFF



C/D: Is it true you were named after Ralph Waldo Emerson?

EF: Yes. My father was named for President Wilson after the first war by my Italian grandfather, who emigrated to Brazil. When my older brother was born, he was Wilson, too, but when I came, my mother—who was Russian but loved Emerson's books—suggested the name because it seemed to match.

■ You enjoyed a meteoric rise after coming to Europe to race, from Formula Ford to your first Grand Prix with Lotus in just one year. What was your relationship like with Colin Chapman?

Colin was an incredible mentor for the four years I drove for Lotus. He was a genius. He had this perception, this intuition to get the car working, to set it up and get the

best from it. I don't think people realized Colin was a very warm human being, but after I won my first world championship, in '72, he said to me, "I don't want to get very close to you because I'm afraid one day I might lose you." He had lost a lot of drivers.

■ How much did you worry about the huge risk involved with racing at that time?

I knew it was high, but every time I arrived at a track, I was focused on giving 100 percent. Jackie Stewart and Jo Bonnier started the Grand Prix Drivers' Association and began to press on safety, to improve the rescue teams and the quality of doctors, just the basics. I supported that, but they led it. One day I made the calculation that from when I started Grand Prix racing to the

day I stopped IndyCar, I had lost 35 friends. I thank God every day that I'm here.

■ Do you regret leaving McLaren to join your brother's Formula 1 team?

My background had always included building cars—go-karts in Brazil and then Formula 3. It felt like the right thing to do, the next step. The start was tough, but by 1980, we had an amazing team—we had Adrian Newey in his first job, Harvey Postlethwaite as chief designer, and Keke Rosberg was my teammate. But then we lost our sponsorship deal. And we could not carry on racing.

■ You unretired in 1984. What brought you back to racing?

It's a good question. Not many people know this, but in '72, after I won my first world championship, I had lunch with my father and brother. I told them I was going to retire from racing; I'm world champion—what else do I want to achieve? And my father said, "I know how you feel, but if you stop too soon, you will want to go back." That's what happened. Ralph Sanchez asked me to drive in the Miami Grand Prix with a March-Chevrolet prototype, and once I was back in the cockpit, it was like I hadn't been away—I put the car on pole. That led to an offer to drive Indy cars, and I did for 13 seasons, the most enjoyable time of my racing career.

■ Which did you prefer, ovals or road courses?

Ovals were a new challenge. I thought they would be easy, but they were not. One-mile ovals were incredible—dozens of cars on the track, some lapping backmarkers after six or seven laps. I had never done anything like it, the most exciting driving I had ever experienced.

■ Were you surprised by the negative reaction when you drank orange juice instead of milk after winning the Indy 500 for the second time, in 1993?

I drank the milk, too—I just used it as a chaser for the orange juice! Of course, nobody ran that picture. I didn't want it to be as controversial as it was, let me say.

■ What would you change about your career?

It's difficult. Everybody has hard

times in life, and I think that anything that you conquer means you appreciate it more. I always worked hard. I always tried to give my best. I think maybe I should have given more effort to improve safety during that tough time. I regret I didn't do more... I tip my hat to Jackie Stewart and Jo Bonnier for the work that they did.

■ You've always had a very distinctive style. Why the sideburns?

As I arrived in England in the late 1960s, there were lots of hippies and lots of people with sideburns and longer hair. Do you remember what the Beatles looked like at the time? I wanted to be part of that generation, to express myself. It was part of a new era of young people. There were more sideburns there than in other countries; maybe it was an English thing!

■ Are you retired now?

A man is like a bicycle: Stop pedaling and you crash. You have to keep going. I'm involved with my two grandchildren who race, and I have a project to build a road car, which has always been my dream. The EF7 is a road car, a GT, very light and very fast. It's being built in Germany by HWA, and Pininfarina did the design. It's stunning. 🇩🇪

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