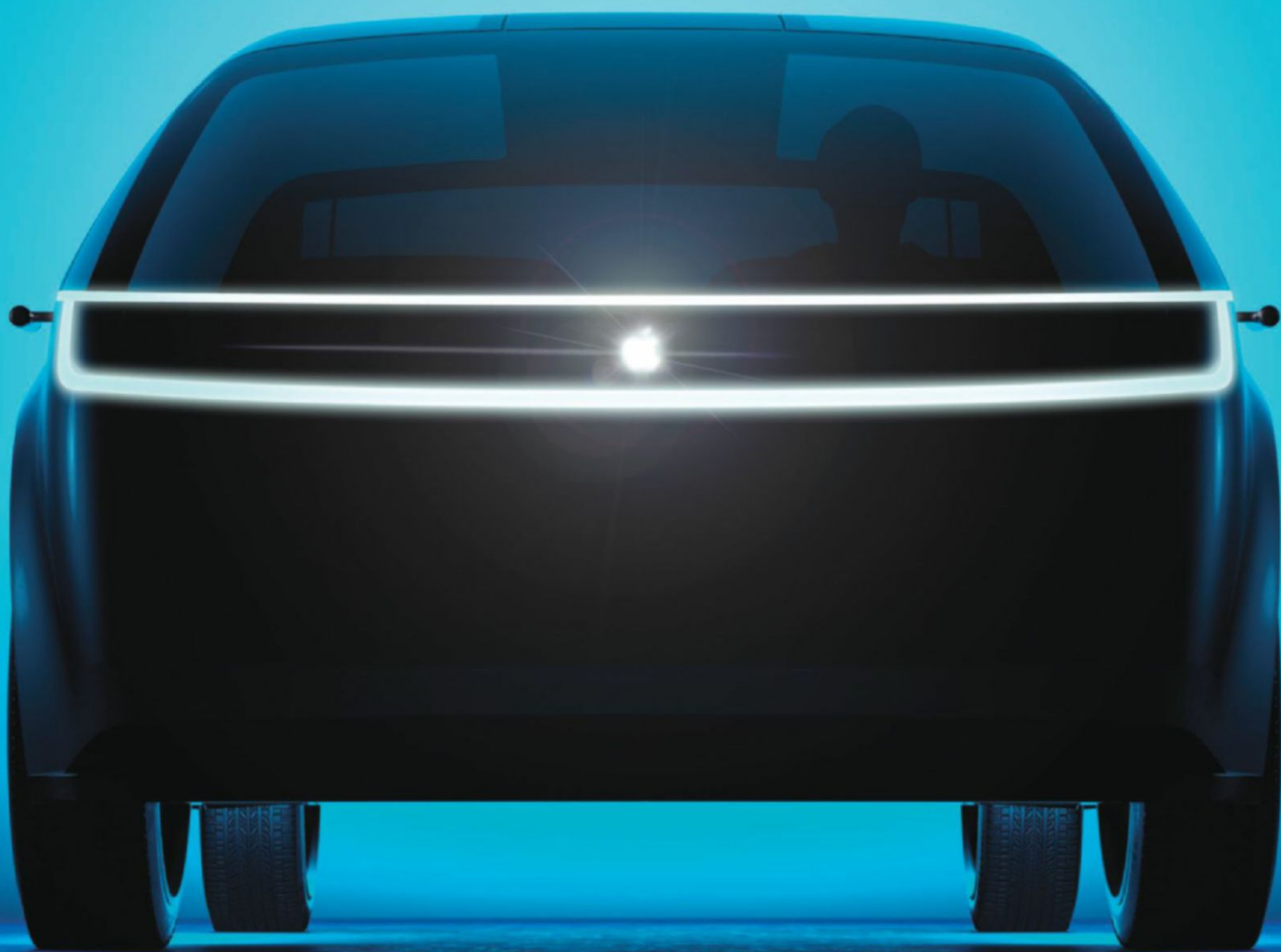


MOTOR TREND

JUNE 2016 MOTORTREND.COM

Hello

Are you the Apple Car?*



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THE STORY OF THE ALL-NEW 2016

MALIBU HYBRID

AS TOLD FROM THE DRIVER'S SEAT

The all-new 2016 Chevrolet Malibu Hybrid is taking efficiency to the next level while providing power that you might not expect in a midsize car. We sat down with the GM Global Chief Engineer for Hybrid and Electric Drive Units to hear firsthand about what makes this vehicle such a breakthrough.



Preproduction model shown throughout. Actual production model may vary. Available Spring 2016.





JASON B. DITMAN

GLOBAL CHIEF ENGINEER,
HYBRID AND ELECTRIC DRIVE UNITS

What makes the all-new 2016 Malibu Hybrid so different from other hybrid vehicles?

It's a new hybrid system specifically calibrated for a midsize car. Several things make it different, including the flexibility of a new two-mode hybrid system, the advanced technology of our batteries, and a unique Exhaust Gas Heat Recovery system. These all work together to optimize driving performance *and* efficiency. Malibu Hybrid uses our new two-mode hybrid system to give us greater flexibility in using two electric motors with an efficient new 1.8L gas engine. Like other hybrids, we accelerate from stop using an electric motor and travel at moderate speeds before the gas engine is needed. Our new hybrid system has the flexibility to keep using the electric motors with the gas engine for additional power and performance,

or the motors can operate by themselves for efficiency when cruising at moderate speeds. So you don't have to compromise your drive for efficiency.

Another difference is our battery. The all-new Malibu Hybrid uses advanced battery technology. We have taken a step forward from battery packs found in the first-generation Volt. Our new lithium-ion battery technology, shared with the second-generation Volt, delivers more power in less space and does so more cost effectively (a low cost per kilowatt hour) than anything we've used before. Then there's our new Exhaust Gas Heat Recovery (EGHR) system. The EGHR can help save energy in cold weather by harnessing previously lost energy. The proof is in the mileage. The new Malibu Hybrid is expected to offer a remarkable estimated 48 MPG city!

*“You don't have to compromise
your drive for efficiency.”*

Jason B. Ditman

GLOBAL CHIEF ENGINEER, HYBRID AND ELECTRIC DRIVE UNITS

How does the efficiency of the Malibu Hybrid system translate to the driver's experience behind the wheel?

It's a lot of fun to drive. Because the motor is tuned for a midsize car, it offers better performance. The two-mode operation lets us provide an exhilarating driving experience and also saves gas as compared to the 2016 Malibu with a 1.5L engine.² The electric motor has some zippy torque. Unlike a gas engine, which takes time to ramp up, the instant torque of the electric motor allows Malibu Hybrid to accelerate quickly. The two-mode system can employ the gas engine more selectively and more efficiently. This can translate into fewer stops at the pump. In terms of architecture, we've been able to engineer the battery to lie flat and maximize trunk space. It's also a pretty sweet-looking ride.

We understand that GM has developed a new electrification platform that supports both HEVs and plug-in electric vehicles. How did you arrive at this and what are its advantages?

Our real-world experience with Volt has advanced our knowledge of how to use electric motors and gasoline engines together for greater efficiency and greater performance. We've applied all of our learnings to create a single platform. This platform can now support hybrid electric vehicles (like Malibu Hybrid) as well as plug-in electric vehicles (like Volt). The new Malibu Hybrid is the first Chevrolet vehicle, after Volt, to bring this platform to market. And our electrification expertise doesn't stop there. This Fall we're launching the 2017 Bolt EV,³ an all-electric vehicle that is expected to offer an estimated more than 200 miles⁴ of range on a single charge for an affordable price.⁵ Malibu Hybrid, Volt and Bolt EV are going to change the way you think about electrification.



¹ GM-estimated 48 MPG city/45 highway. Official EPA estimates not yet available. Fuel economy estimates based on GM testing. ² Malibu with 1.5L engine EPA-estimated 27 MPG city/37 highway. ³ Available late 2016. ⁴ Based on GM estimates. EPA estimates not yet available. Actual range varies with conditions. ⁵ Priced as low as \$30,000 after federal tax credit. Net price shown includes the full \$7,500 tax credit. \$37,500 MSRP including Destination Freight Charge with tax credit from \$0 up to \$7,500. Tax, title, license and dealer fees extra. Actual savings from the federal government depend on your tax situation. Consult your tax professional for details.



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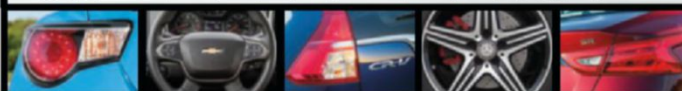


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The Lohdown

But will you love it?



Like an increasing number of people around the world, I spend a lot of time every day holding, gazing at, and stroking a thin, rectangular wafer of glass, silicon, and aluminum.

My particular brand of smartphone happens to be from Apple, whose long-rumored car we have imagined for the cover story of this issue. Our story was exhaustively researched by our editorial team, led by Kim Reynolds, but I should state that it is entirely speculative. We asked Apple for confirmation and details on any future vehicle, but the famously secretive company had no comment.

But let's suppose that this story comes true and Apple's Project Titan bears fruit in a season not too far ahead, with or without the design and features we have outlined. Could you love it?

I ask because, as a reader of this magazine, you probably love cars more than the average human being. You're an automotive enthusiast, like me, and I know that I can almost always find something to love about any car.

Thinking about love and an Apple car forced me to examine my relationship with my iPhone. Do I love it? I spend far more time with it than any vehicle—or person. It is with me nearly 24 hours a day. It sits on my desk at work, rests beside my bed at night, and goes with me everywhere in between, except underwater—and I suspect that limitation is on some Apple hardware engineer's to-do list.

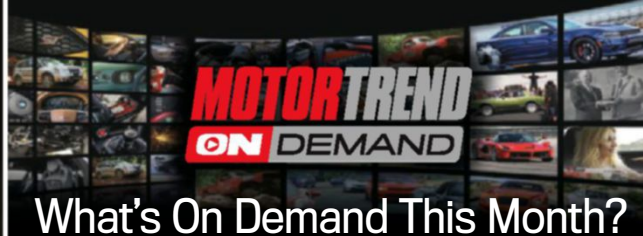
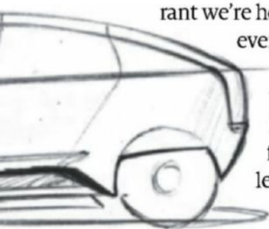
My iPhone has taken me places and done things no car ever could. It has replaced my CD collection, camera and photo album, mailbox, notepad and pen. Through its small screen, I watch high-definition movies, chat with the universe without ever hearing a voice, and peer into the lives of others. It has become a co-pilot, coach, confidant, and research library. Then there are the new apps and services that surface every day.

The iPhone has become an indispensable part of my life. I use its dizzying power for work, play, and the time wasted in between. I am grateful for all the problems it has solved (although not the ones it has introduced—"I'm sorry, what were you saying?") But for all that it does for me, I don't love it; the relationship is deeper, more complicated and colder than that. Had the iPhone never been invented, I suspect I would be just as beholden to another device or set of devices that accomplish similar tasks. I suppose this relationship is similar to the one between cars and non-car enthusiasts.

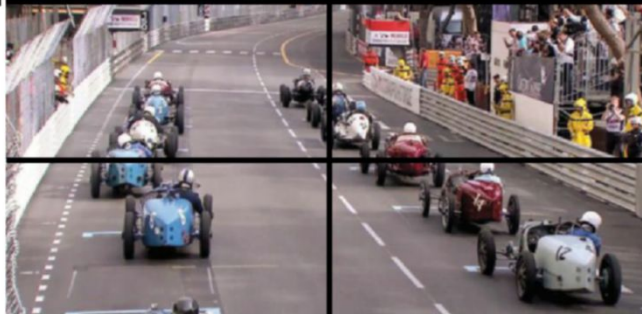
In stark contrast are the warm, uncomplicated feelings I have for my two personal cars. Both were built in the late '80s; one leaves oil spots on my driveway and has a notchy fifth gear, while the other magically transfers money from my bank account to the wallets of various mechanics. Neither syncs with my iPhone, sends me breaking news updates, or tells me whether the restaurant we're heading to will be any good. They do nothing yet everything for me, and I love them to bits.

Should an Apple car come to market and be as transformative to transportation as the iPhone has been to communication, I wonder how our feelings for cars will change. Please feel free to let me know, perhaps through your iPhone. The easiest way to find me is on Twitter, @edlo.

My iPhone has taken me places and done things no car ever could.



What's On Demand This Month?



MAY 14, 15 Monaco Historic Grand Prix (Monte Carlo)

Historique coverage planned

On May 14 and 15 Motor Trend OnDemand celebrates the 10th edition of the Grand Prix de Monaco Historique with exclusive live coverage from the world's most famous grand prix circuit. Organized by the Automobile Club de Monaco and first held in 1997, this unique biennial event gives collectors the opportunity to unleash rare historic Grand Prix racing cars and let them shriek at full song through the famous tunnel and

scream past the harbor, flanked by unforgiving barriers and luxury yachts. Seven classes of historic Grand Prix cars take to the track, including front engine cars of the 1950s, the first mid-engine cars of the 1960s, and the 3.0-liter cars of the late 1960s and 1970s. This is a must-see event for classic motorsport aficionados who will enjoy the sights and sounds of amazing cars from racing's golden age as the drivers tackle the legendary Monaco circuit.

SCHEDULE

The Pirelli World Challenge kicks off this month's **RACING** schedule, along with brand-new episodes of our *Motor Trend ORIGINAL PROGRAMS* on motortrendondemand.com.

APRIL 22, 23, 24 Pirelli World Challenge - Live (Alabama)
APRIL 25 Blancpain GT Series - Endurance Cup (Italy)
APRIL 26 DIRT EVERY DAY EP 51
APRIL 27 MotoAmerica - Highlights Road Atlanta (Georgia)
Pirelli World Challenge - Highlights Toyota Grand Prix of Long Beach (California)
Motorsport Mundial
APRIL 28 FIM Motocross World Championship (Argentina)
MAY 1 British Touring Car Championship (Donington)
Lamborghini Super Trofeo North America (Monterey, CA)
MAY 2 Mobil 1 the Grid IGNITION EP 152
MAY 4 Motorsport Mundial HEAD 2 HEAD DRAG RACE EP 2
MAY 5 V8 Supercars (Phillip Island, Australia)
HOT ROD GARAGE EP 149
European Le Mans Series (England); **FIM Motocross World Championship** (Mexico)

MAY 7 DTM Championship (Germany)
MAY 9 ENGINE MASTERS EP 10
FIA Formula 3 Championship (Hungary)
MAY 11 MotoAmerica (New Jersey)
Motorsport Mundial
MAY 13 ROADKILL EP 52
MAY 14, 15 Monaco Historic Grand Prix (Monte Carlo)
MAY 16 Mobil 1 the Grid IGNITION EP 153
MAY 17 Ferrari Challenge Europe (Italy)
MAY 18 British Touring Car Championship (Thruxton)
HEAD 2 HEAD EP 77
Motorsport Mundial
MAY 19 FIM Motocross World Championship (Latvia)
ROADKILL GARAGE EP 4
MAY 20 THE RACING LINE EP 7
MAY 21 DTM Championship (Austria)
MAY 21, 22 Pirelli World Challenge (Canada)
MAY 23 SKUSA (Glendale, AZ)
V8 Supercars (Perth, Australia)
Audi TT Challenge (Germany)
MAY 24 DIRT EVERY DAY EP 52
MAY 25 MotoAmerica Virginia International Raceway (Virginia)
Motorsport Mundial
MAY 26 FIM Motocross World Championship (Germany)

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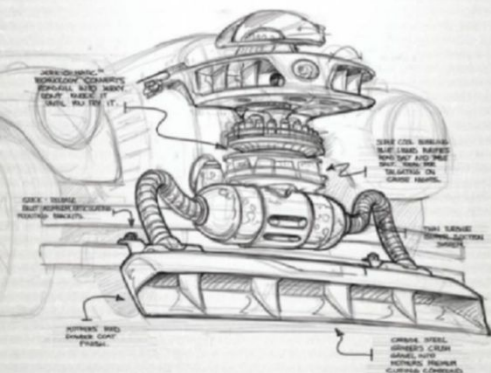
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INTAKE P18
THIS MONTH'S HOT METAL

WE SAY P28
WORDS FROM OUR EDITORS

DETOUR P32
GEAR, FACTS, INFO

FIRST LOOK

2017 Nissan GT-R

GODZILLA GOES UPSCALE



Godzilla has been made over many times in his movie career, and now his four-wheeled compatriot is also getting a big makeover. With new looks and greater performance, the 2017 Nissan GT-R is far and away the biggest update to Godzilla since it made its debut nearly 10 years ago.

Nissan has always felt that it's

nailed the R part of the GT-R's name since its 2009 launch, but it placed a bigger emphasis on the GT aspect for the 2017 update. Or as Nissan North America product planner Bob Munson puts it, "We're trying to give the thoroughbred racehorse some more manners." As such, the most significant changes are visual. This means an all-new front bumper, grille, and hood, new side sills, and a new rear bumper with a prominent diffuser and functional vents. New 20-inch forged aluminum wheels finish the look. Nissan claims the new bodywork increases aerodynamic efficiency

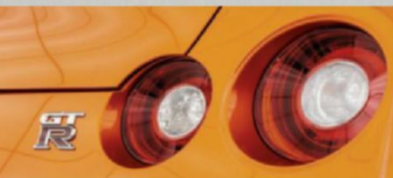
and downforce, though it retains the same 0.26 coefficient of drag.

Even greater work has been done inside, where Nissan completely revamped the GT-R's interior. The dashboard and center stack are all-new and complemented by a new instrument cluster wrapped in a single piece of leather. The center stack now sports an 8-inch touchscreen (up from 7) that can now also be controlled by a new Display Command controller on the center console. The rest of the stack has been simplified to

just 11 buttons, down from the old car's 27. The screen's interface is also somewhat simplified; it features large icons for easy operation.

Nissan has fitted a new steering wheel and relocated the paddle shifters from the column to the wheel, taking care to make sure the new paddles still feel and sound right. The seats also feel better and are lighter. Nissan saved weight by thinning the cushioning beneath the dashboard's leather surface.

Not all of the car's padding



BIG CHANGES Nissan brought the GT-R up to date with the company's latest styling language. But, of course, the circular taillights survive.



With new looks and greater performance, this is the biggest update yet.



“We’re looking into [the midsize pickup market].”

FOND MEMORIES The Comfort shock absorber setting in the current and stiff GT-R is, in a word, optimistic. Perhaps that’ll change in the 2017 car.



THEY SAY P34 INTERVIEW
SERGIO MARCHIONNE, CEO, FIAT CHRYSLER

YOUR SAY P36
READERS TALK BACK



Intake



GIVING THANKS After pumpkins and yams, we're thankful for any modicum of added comfort going into the GT-R's seats.



is thinner, though. The new car gets additional sound-deadening materials and an acoustic glass windshield to reduce noise. The transmission has also been quieted, and the titanium exhaust now features a valve to hush it on command. The GT-R gets active noise canceling technology, as well.

The changes extend beyond the cosmetic. The twin-turbo, 3.8-liter V-6 has been updated with parts from the old GT-R NISMO, upping power to 565 hp and 467 lb-ft of torque (improvements of 20 hp and

4 lb-ft) thanks to more boost and individual timing control for each cylinder. In addition to the greater peaks, the changes are said to improve midrange and high-rpm power, giving Godzilla a beefier torque curve. Nissan says that new exhaust, when the driver chooses to open it, sounds better, too. The improved engine is paired to an improved six-speed dual-clutch gearbox that had its shifting behavior smoothed out for everyday driving, but it's still aggressive with your foot to the floor. With the GT-R's curb weight



still around 3,900 pounds and only minor power gains, don't expect the lightning-quick 0-60 capability to change much from the old car's 2.7-2.9 seconds.

Nissan did a bit of work under the body, as well, stiffening the chassis to more effectively use

the lightly reworked suspension. Thanks to the changes, Nissan says the new GT-R both rides better and corners quicker.

To top off the deal, Nissan is adding the new Blaze Metallic paint option to all models and three new interior color options if you buy the Premium Edition. Cars equipped with NissanConnect get navigation with mobile apps and the Services package, which allows you to operate some vehicle functions, such as activating the alarm, from your smartphone and can track the car if it's stolen.

The more powerful, more comfortable GT-R will go on sale this summer. The base car, if you can call it that, will be the GT-R Premium shown here. It'll eventually be joined by three more trim levels with increased performance. The 2017 GT-R will likely cost at least as much as the current car, which starts just above \$102,000. **Scott Evans and Christian Seabaugh**



FAN FAVE It may not have 600 hp like a NISMO, but expect a hard launch and tight gearing to keep the GT-R as a favorite for our annual World's Greatest Drag Race.

Nissan says the new exhaust sounds better.

2017 NISSAN GT-R Price \$103,000 (est) **Layout** Front-eng, AWD, 4-pass, 2-door coupe **Engine** 3.8L/565-hp/467-lb-ft twin-turbo DOHC 24-valve V-6 **Trans** 6-speed twin-clutch auto **Curb WT** 3,900 lb (MT est) **WB** 109.4 in **L x W x H** 185.4 x 74.6 x 53.9 in **0-60** 2.8 sec (MT est) **EPA Econ** 16/22/19 mpg (est) **On Sale** Summer

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REARVIEW



50

JUNE 1966
PRICE: \$0.50

We're not 100 percent sure what we were thinking with the art for our June 1966 cover, but at least the

content was strong. Our Used Car Buyer's Guide took readers through how to spot a lemon, financing and insurance traps, and how to put one over on your salesman. We also looked at the luxurious new Jeep Wagoneer 4x4 and the Oldsmobile 4-4-2.



30 10

JUNE 1986
PRICE: \$2.25

The "Jet versus 'Vette" story graced our June '86 cover. We teamed up with iconic test pilot Chuck Yeager to compare a 200-mph Corvette to a super-sonic T-38 Talon trainer.

JUNE 2006
PRICE: \$3.99

We gathered five tuned American supercars, sports cars, and muscle cars to see which one had the right stuff to beat the LS7-powered Corvette Z06. One even hit 217.85 mph.



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Intake

FIRST LOOK

2017 Chevrolet Camaro ZL1



YOUR HELLCAT-KILLING, FOUR-SEAT Z06



What if a Corvette Z06 had four seats? More than a few people have no doubt asked themselves that question when trying to rationalize a Z06 with the realities of family life, and Chevrolet appears to be answering with the all-new 2017 Camaro ZL1.

No, a Camaro isn't a Corvette, but hear us out. This new ZL1 uses the Z06's LT4 6.2-liter, supercharged V-8 fitted with a Camaro-specific intake, two-mode exhaust, and computer tuning, and it's good for 640 hp and 640 lb-ft of torque. It employs magnetorheological shock absorbers like the Z06, careful aerodynamic tuning like the Z06, scads of fluid coolers like the Z06, an electronically controlled limited-slip differential like the Z06, Drive Mode Selector

and Performance Traction Management like the Z06, big Brembo brakes like the Z06, the Performance Data Recorder like the Z06, and racing seats like the Z06. The only thing the ZL1 didn't copy is its looks.

Even if it's not identical to the Z06, there's a lot to like here. Where the old ZL1 was more dragstrip than road course, this one's designed for curves. Adjustable magnetic shocks are standard, as is the electronically

controlled limited-slip and the Recaro race seats. The exterior has been extensively reworked in the wind tunnel and on the Nürburgring to improve aerodynamics, and it features a big front splitter and rear wing, new rockers, wider front fenders, new underbody panels, a larger lower grille for more airflow, new front brake-cooling ducts, and a new hood with a carbon-fiber vent. The old Z/28's famous "flow tie," a hollowed-out Chevrolet bow tie badge that allows for more airflow into the radiator, makes its return on the upper grille. No need to worry about overheating, either. A ZL1 aerodynamics engineer told us that although keeping the LT4 cool is always a challenge, his team was



UNDERCOVER BOSS If your boss dons a racing helmet every once in a while, as GM president Dan Ammann is seen doing here, you'll at least have a conversation starter at the water cooler.

able to shoehorn 11 heat exchangers into the Camaro. Like the Camaro SS, the ZL1 rides on 20-inch wheels at all corners, but it wears 285-width front and 305-width rear tires like the old ZL1, specifically Goodyear Eagle F1 SuperCar tires designed for the ZL1. They're backed by six-piston front and four-piston rear Brembo calipers chewing on 15-inch front and 14-inch rear rotors, themselves 1.5 and 1.0 inches larger in diameter than on its SS sibling.

The lower curb weight will further enhance the new ZL1's cornering ability. Chevrolet says the new car is 200 pounds lighter than the old one, which would make it about 3,850 pounds based on our measurement of the previous ZL1. That's about 150 pounds heavier than the SS, but the extra 60 hp and 84 lb-ft ought to handle it fine.

Handling that extra power will be a standard six-speed manual gearbox with active rev matching and performance gearing. Chevrolet's all-new, paddle-shifted 10-speed automatic (co-developed with Ford, in an amusing twist) is optional; the company says it will offer incredibly fast gearshifts and close gear ratios. It'll be GM's first application of the new transmission, which will be rolled out to numerous other products in the near future.

That's the hardware, and there's equally impressive software to go with it. GM's excellent Performance Traction Management system, which allows the driver to dial in as much or as little assistance as desired, is standard. The ZL1 also comes equipped with Drive Mode Selector, which lets you toggle from Eco mode all the way up to Track. It's got a new trick, too: Custom Launch Control, allowing you to dial in the exact launch rpm you need based on track conditions at the strip. GM's Performance Data Recorder, which allows you to record video and data from your hot laps, is available.

Chevy is so confident in the Camaro ZL1's track credentials that GM president Dan Ammann and executive vice president of global product development Mark Reuss surprised journalists with track rides at Nevada's Spring Mountain Raceway on the Camaro Convertible launch. With Ammann



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Intake

DECISIONS, DECISIONS
Shall we test the just-feels-right six-speed manual or intriguing 10-speed auto first?



and Reuss at the wheel, the 10-speed-equipped ZL1s were E-ticket rides. The Camaro is thrillingly quick—it hooks up and accelerates smoothly without the violence of something like a Challenger Hellcat. The 10-speed automatic appeared to shift instantly at the pull of the steering wheel-mounted paddles as the GM execs rattled up and down through the first six gears on the track. The Magnetic Ride Control shocks helped keep the Camaro ZL1 flat through corners, and it shrugged off the track's curbing, much like the old Camaro Z/28 did.



After the lap we caught up with Al Oppenheiser, chief engineer behind the new Camaro. "The ZL1's benchmark was the Z/28," he said when we asked him if the new ZL1 was quicker around the track than the Z/28. "And you know what benchmarks are for."

The old ZL1 automatic was good for a 3.9-second sprint to 60 mph at a 12.2-second quarter mile at 117.2 mph on our test track, and we expect this lighter, more powerful, better-gearred car to bring those times down and that trap speed up. Previous ZL1s have achieved as much as 1.03 g average lateral grip with figure-eight times as low as 23.9 seconds—all of which are likely to be bested by the new one. The last-gen ZL1's best 100-foot 60-0 stopping distance will be tough to beat, but that might fall, too. Given that the old ZL1 was nipping at the heels of the 707-hp Dodge Challenger Hellcat on the dragstrip, this new car will likely outrun the Hellcat just as easily as it out-handles the big coupe. If Ford does another Mustang GT500, it will have a hell of a fight on its hands.

You can get yours late this year, sometime in the fourth quarter. Pricing hasn't been announced, but the old model's \$57,650 starting price is likely indicative of where this new ZL1 will start.

Scott Evans and Christian Seabaugh

G SPOT The seat's side bolsters will earn their keep, as the ZL1 should easily average more than 1 lateral g.



**It hooks up without
the violence of
something like a
Challenger Hellcat.**



MIKE CONNOR

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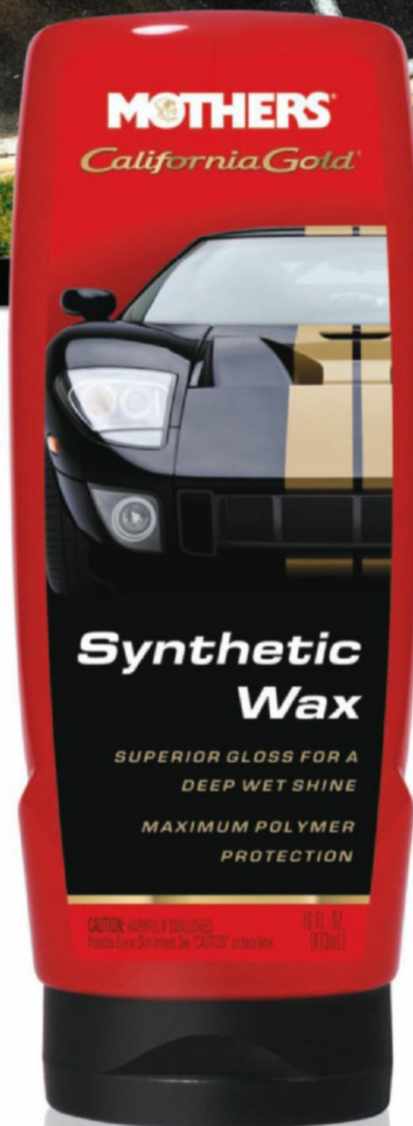
Depending on where you sit, the **rotary engine** can be an object of equally intense desire and frustration, and that even goes for the people building it. **Mazda's been trying to bring it back for years and made the bold promise at last year's Tokyo show that it's going to happen.** We've been skeptical given the massive hurdles it faces, but insiders tell us it's for real this time. Apparently, the sticking points—emissions, fuel consumption, oil consumption ... you know, little stuff—are being fixed with modern tech, and if the so-called Skyactiv-R engine can pass two more key validation “gates,” it could actually go into production. **In what car? Mazda's RX-Vision concept,** clearly. That's the Tokyo show car we featured a few issues back and (hopefully) a sneak peek at the RX-8's successor. Don't just take it from us, though. We recently counted **GM design boss Ed Welburn and Bentley exterior design guru SangYup Lee** as fans of the RX-Vision, and although a number of changes will be necessary for production, we hope the warm reception will keep Mazda dedicated to the design... **Volvo's got a hit concept** on its hands, as well. Not long ago, the Swedes yanked the front passenger seat out of **the new XC90 SUV** and replaced it with an integrated child seat designed to keep baby close to the driver and as safe as possible. Well-off moms swooned, and we hear **Volvo is going to put it into production.** Once their little angels outgrow the seat, we expect the XC90 mommy mobile edition will have incredible resale value among parents who can't afford a brand-new luxury SUV. **This development bodes well for Volvo's other three-seat XC90 concept,** which replaced the front passenger seat with a combination TV screen and footrest for the university president who prefers to be driven.... In other luxury conveyance news, **a new Lexus LS sedan is finally on its way.** We saw a preview of the design at last year's Tokyo show in the LF-FC concept, and we'll see the real deal next January at the Detroit show.... Also on the topic of new car debuts, that **Mercedes-AMG GTR** we told you about will debut this month at the Goodwood Festival of Speed. Less than six months later, the predictable but heretofore unknown **AMG GT Roadster** will debut at the Los Angeles show.



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Intake



2016 Audi S8 Plus and RS 7 Performance



Audi recently introduced higher-output variants of two sedans (the S8 and the RS 7) that probably didn't

need any more power. But who are we to complain? Both the new S8 Plus and RS 7 Performance's twin-turbo, 4.0-liter V-8s are replaced with the same upgraded, overboosted engine that, when the transmission's Sport drive or Manual mode is selected, develops 605 horsepower and 553 lb-ft of torque. In Drive, the V-8 will revert to the non-overboosted torque output of just 516 lb-ft.

Audi conservatively estimates the S8 Plus should run 0-60 mph in 3.7 seconds, the RS 7 Performance in 3.6 seconds. Yet *Motor Trend's* last tests of the standard versions of these super

Newcomers

TINGLING FEELING
So how does wielding this kind of power feel? The sensations are ones of urgency mixed with a generous portion of gravitas.

sedans produced 3.5 seconds (S8) and 3.2 seconds (RS 7), so expect our instrumented tests to reflect that, like 3.3 and 3.0 to 60, respectively.

Where the S8 Plus' optional sport exhaust produces a muted, respectable rumble, like there's a Chris-Craft held captive in the trunk, the RS 7 Performance's on-throttle staccato and off-throttle fire-belching pops are certain to draw attention, especially in Sport mode. Leaving either one in Drive allows smooth, almost imperceptible up/downshifts, but in Sport—or by just grabbing a gear with shift paddles—elicits sharper shifts and

that lava-gargling sound we so love. Also, temporarily disabling electronic stability control at a stop with the car in Sport allows for a quasi-launch control and those gobsmacking sub-4.0-second 0-60 runs. These super sedans exude effortless, addictive, and ultimately corrupting power—all in a good way. **Chris Walton**



SPECS RS 7 Performance; **S8 Plus Price** \$129,925; **\$115,825** **Layout** Fr-engine, AWD, 4-pass; **5-pass**, 4-door hatch; **sedan** **Eng** 4.0L/605-hp/516-lb-ft* twin-turbo DOHC 32-valve V-8 **Trans** 8-speed auto **Curb Wt** 4,500; **4,700** lb (mfr) **WB** 114.8; **117.8** in **L x W x H** 197.3 x 77.8 x 55.8; **202.2 x 76.7 x 57.4** in **0-60** 3.6; **3.7** sec (mfr est) **EPA Econ** 15/25/18; **16/26/20** mpg **On Sale** Now



RS 7 Performance

*553 w/ overboost

2016 BMW X4 M40i

I know I'm supposed to keep my mouth shut if I don't have anything nice to say, but you paid for this magazine, so you deserve at least a few sentences. Let me squeeze out a few compliments.

The 2016 BMW X4 doesn't suffer in headroom as much as other sport-utility "coupes." In fact, its cabin has about as much headroom as the larger X6. The elegantly named X4 M40i is quick, hitting 60 mph in a claimed 4.7 seconds. Oh, and it's a lightweight at a mere 700 pounds more than the Toyota RAV4, a similarly sized vehicle with slightly more than twice the cargo capacity.

Some other facts: This new M40i thing is the top dog of the X4 lineup,



M ALL THE THINGS
The X4 M40i has M adornment on the doorsill plates, instrument cluster, steering wheel, and gear lever, but Motorsport is nowhere to be found.

which also includes the 240-hp xDrive28i and the 300-hp xDrive35i. The M40i wears a bunch of M logos so that BMW can further accelerate its tarnishing of a brand name that once, literally, stood for "Motorsport." The M40i's straight-six makes 355 hp, and its exhaust fills the cabin with the sort of droning moan that says "sporty" if you're hard of hearing, or "just kill me" if

your ears are healthy.

This X4 handles, too, with optional Michelin Pilot Super Sport tires, electronically adjustable dampers, and BMW's "Performance Control." That last feature is not to be confused with the X6's "Dynamic Performance Control," an honest-to-goodness torque-vectoring rear differential. Instead, the X4 M40i's stability control is programmed to change the attitude of the car when you least expect it by grabbing a rear brake. At least you feel none of it through the numb steering.

Oops, I was supposed to be nice. Here: The X4 isn't nearly as ugly as the X6. **Jason Cammisa**



SPECS Price \$58,795 **Layout** Fr-eng, AWD, 5-pass, 4-door SUV **Eng** 3.0L/355-hp/343-lb-ft turbo DOHC 24-valve I-6 **Trans** 8-sp auto **Curb Wt** 4,250 lb (mfr) **WB** 110.6 in **L x W x H** 184.3 x 74.8 x 63.9 in **0-60** 4.7 sec (mfr est) **EPA Econ** 18/25/21 mpg **On Sale** Now

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We Say...



Ron Kiino
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Sunshine State of Mind Daytona, 200 mph, and cheese fries



David, the friendly guy who delivered the Phantom Black 2016 Chevrolet SS to Charlotte Douglas International Airport, handed me the key. "Going for a cool drive nearby?" he asked. "I'm actually driving to Daytona, to see the 500," I said, excited that I was finally checking the so-called Great American Race off my bucket list. The look he gave me mirrored what immediately dawned on me: Why hadn't I just flown directly to Daytona Beach? The answer, of course, was the 415-hp four-door sitting next to me, the one whose name is placarded all over the 725-horsepower "stock" cars that Chevrolet races in the NASCAR Sprint Cup series (restrictor plates at superspeedways such as Daytona cut power to around 425). Chevy sold only 2,895 SS sedans in 2015, so it jumps at any chance to tie in the nameplate with the series. Thus, my options were to drive an SS from Detroit or Charlotte. As much as I love long road trips—and the SS for that matter—I chose Charlotte.

A dual-mode exhaust is new for the 2016 SS, and while it's pedestrian under light throttle, it's downright rip-roaring when you put the spurs to the 6.2-liter LS3 V-8. Plus, it goes all snap-crackle-pop when coming off throttle. Intoxicating. Every few miles I'd do a WOT-then-coast two-step just to get my auditory fill. As I made my way from Georgia to Florida, feeling good about the salad, dark chocolate, and kombucha I downed at the Whole Foods in Savannah, I pondered the SS—an Australian-built rear-drive V-8 sedan that offers European dynamics and American muscle car music—and couldn't help but think globalization ain't all that bad.

I'll never know what Daytona International Speedway was really like, given that my visit to the 58th running followed a \$400 million off-season renovation that rendered the first "Motorsports Stadium" replete with five four-level title-sponsored main entrances, 101,000 new grandstand seats, 40 new escalators, and more than 900 additional bathrooms. The last proved especially useful since Daytona fans chugged more beer during the race than the 5,400 gallons of fuel the drivers used. Speaking of beer, nearly every fan was holding a light beer, nestled in a cold-keeping koozie, of course, and usually accompanied by a light cigarette in the other hand. NASCAR gives new meaning to "traveling light." More than just refreshment, the light beer serves another important purpose: wash down the heavy grub sold at the infield food stands. One purveyor had attracted long lines with a menu that included a Philly cheesesteak (listed twice), cheese fries, a foot-long corn

dog, loaded cheese fries with steak, and Italian and Polish sausages. Where's the beef? More like, Where's the Lipitor?

Despite the food and beer, most fans seemed to stay awake during the race, even if it wasn't the action-packed event it often is. There was a handful of wrecks, including incidents that ate up Danica Patrick and Dale Earnhardt Jr., but none of the flipping-through-the-air multicar pileups Daytona is famous for. Throughout most of the race, the 30-plus cars stayed in a big 200-mph pack, mere inches from one another, traveling a football field every second, drafting and jockeying for position. On the last corner of the last lap, the jockeying got fierce, with leader Matt Kenseth relinquishing the lead after a failed block of Denny Hamlin, who went on to edge out Martin Truex Jr. by 0.01 second, the slimmest margin in Daytona 500 history.

Over my leisurely 497.2-mile trip, the stock 415-hp SS drank 23.7 gallons of 93-octane Sunoco unleaded at a cost of \$53.79 and averaged 21.0 mpg and 66.1 mph. Total time: eight hours, including that 40-minute stop at Whole Foods. Hamlin's intense 500-mile journey in his 425-hp stock car Camry, on the other hand, required 57 gallons of 98-octane Sunoco Green E15 race fuel (dubbed "green" for its color) at a cost of about \$600. His averages came in at 8.8 mpg and 157.5 mph with a total time of 3:10:25, including six cautions.

The tagline for Wrangler jeans, which I saw plenty of at the track, is "Real. Comfortable. Jeans." In that spirit, I'll say this about my first Daytona 500: Great. American. Race. (Though I keep thinking: Loaded. Cheese. Fries.) ■



INJECT Chevrolet's gateway to Daytona, one of five "injector" entrances, welcomes race fans.



The 30-plus cars stayed in a big 200-mph pack, mere inches from one another.

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We Say...



Frank Markus
TECHNOLOGUE

Illustration Isabel Espanol

Road Hard (If not put down wet) Rethinking concrete science



Many ancient civilizations came up with lime-based cementlike materials to use as mortar in construction, from the gypsum-based plaster used on the pyramids in Egypt to sticky rice/lime mortar employed in parts of the Great Wall of China, but it was the Greeks and Romans who got lucky by adding locally abundant volcanic ash to their cement mix. This formula resulted in a mortar that not only set up quickly and with great strength but could also harden under water and then survive 2,000 years of crashing seas, as the seawall in Italy's Pozzuoli Bay has. When the Romans mixed in bits of brick and gravel, they got *opus caementicium*, which we now know as concrete from the Latin, *concretus*, which means "to grow together." Ever visited the Pantheon in Rome? That amazing freestanding dome with a 142-foot diameter is made of the stuff. Unreinforced. It has survived 1,890 years and multiple earthquakes with little or no maintenance. So why can't our roads and bridges survive a tiny fraction as long?

Research just released in February by MIT, Georgetown University, the French National Center for Scientific Research, and the Concrete Sustainability Hub aims to provide some answers. For all these millennia, nobody has fully understood the atomic-level crystal

grain structure of this miraculous material that upon adding water becomes a paste that can flow into complex forms and then harden into a strong solid in a matter of hours or weeks depending on the formula used.

When the water is added to dry cement and aggregate materials, it forms a cement paste. Chemical reactions then begin to take place, resulting in the formation of calcium silicate hydrates (calcium aluminum silicate hydrates when volcanic ash is added) of varying grain sizes and chemistries and the release of heat. These interlocking grains and the sizes of the pores and voids between them give concrete its strength. It turns out that this structure is neither a continuous solid (like metal or stone) nor an aggregate of small particles. It behaves like a mixture of both, the amount and distribution of the pore spaces between grains suggesting the material's susceptibility to water intrusion and subsequent cracking. "These pores are the fingerprints of the water you put in initially,"

senior research scientist Roland Pellenq says. Hence it is vital to minimize the amount of water used to form the paste. Big pores can form pathways for chlorine ions to reach and corrode reinforcing steel, and this porosity also has an effect on creep and fracturing that can lead to structural failure.

Pellenq's team is developing computer models for predicting the atomic and micron-scale structures that result from particular cement formulations. They're also working to model mechanical loading of concrete structures formed by these mixes—say, for example, the impact of heavy trucks traversing a stretch of roadway. (The sooner academia can scientifically prove the idiocy of Michigan laws permitting 164,000-pound, 11-axle trucks, the better our roads will be regardless of cement formulation.)

Optimizing concrete formulations to suit particular applications has the promise of greatly extending the material's useful life. This will pay huge environmental dividends, as global manufacture of today's ubiquitous portland cement (which involves de-carbonating calcium carbonate in a kiln at 2,642 degrees F) is the largest industrial source of CO₂ production. Devising formulations that incorporate various polymers or ash from volcanos or coal power plants promises to reduce the CO₂ required to produce the cement, as does the use of a new experimental cement called Celitement, which uses one-third as much limestone. And if the Pantheon's any indication, I'll bet Pellenq's simulation models will award high marks for strength, durability, and eco-friendliness to the volcanic ash mixes. ■

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The Jeep Wrangler, with its classic, rugged appearance and proven capabilities, is one of the most iconic off-road vehicles on the market. When you're hitting those colder off-road trails, Poler's Outpost Wool Jacket and its flannel body lining, taffeta sleeve lining, and wool exterior offer that same classic feeling. Wrap up your excursion with a traditional Latin Machete from Cold Steel, and you're ready for whatever gets thrown your way.



Mercedes-Benz G-Class

Poler Bomber Jacket • \$265 • polerstuff.com
Cold Steel All Terrain Chopper • \$44 • coldsteel.com

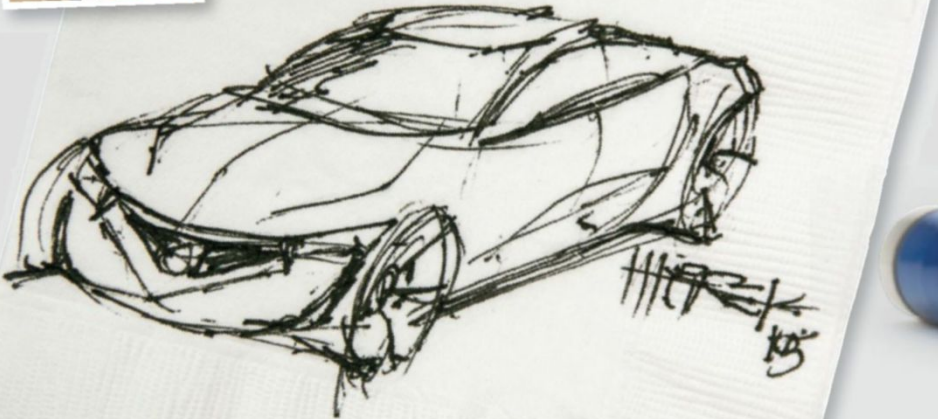
The Mercedes-Benz G-Class, originally developed for military use, has proven itself in the off-road game while also being more luxurious than other off-road vehicles. Throw in Poler's Down Bomber Jacket for that military feel. Its lightweight water-repellant shell and Thermastuff down insulation will keep you warm. Cold Steel's All Terrain Chopper completes the military look and feel, pairing nicely with the G-Wagen's sharp lines.



BACK OF THE NAPKIN

DAVE MAREK, GLOBAL CREATIVE DIRECTOR, ACURA

Marek did this sketch of the Acura Precision Concept, unveiled at the 2016 Detroit auto show. He couldn't confirm whether the concept will head to production, but he did say it's a strong hint of what's to come from Acura's styling. One notable feature is the absence of Acura's signature shield grille (also referred to as the beak).





6.16 TRND

Toyota Land Cruiser

Poler Scout Jacket • \$220
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Cold Steel Katana Machete • \$70
coldsteel.com

The Land Cruiser's off-road capability is enabled by a technology-first credo. Poler's Scout Jacket, which has a 10k waterproof outer layer, hews to the same motto. With an advanced and durable design, it's ready to go as far as the Land Cruiser will. Cold Steel's Katana is a great match for the Japanese four-wheeler in both tradition and build quality. Plus, Michonne would love this thing.



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Signal multitool • \$100 • leatherman.com

Clean water, shelter, and fire are the top three needs when trying to survive. LifeStraw's personal water filter is compact, lightweight, and durable, plus it filters out 99.99 percent of waterborne pathogens. Leatherman's Signal multitool has the second two needs covered; it has a Ferrocerium rod (fire) and a saw (shelter) among its 19 tools.



K-band false alarms driving you nuts?

The problem: Barraged by K-band false alarms lately? Seems like they're everywhere, and they hang on and on.

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Paul Fredrick

They Say

Sergio Marchionne

Interview CEO, FIAT CHRYSLER AUTOMOBILES



Switzerland may be neutral soil, but a session with the outspoken Sergio Marchionne, CEO of Fiat Chrysler Automobiles, during the Geneva Motor Show yielded an array of defensive maneuvers and news nuggets.

Many of the jabs were about product delays, especially for Alfa Romeo. Marchionne said he “did not postpone investment in Alfa; we postponed the launch of vehicles, and there is a difference.” His stance: The Giulia announcement last June marked a decision two and a half years in the making on the architecture, and future Alfas will be a derivation of that choice. “That investment has been made, so nothing has been slowed down,” he said. The visible parts of the vehicle are the least expensive and easiest part of the engineering.

One reason for the delay: Import restrictions mean China is not profitable right now, and the business case isn’t strong enough without it. Marchionne also said he wants to make sure the highest performing variants deliver on road and track, or else it’s all a waste of time.

Meanwhile, the North American market is undergoing

a shift back to larger vehicles, especially SUVs and pickups, and that will continue even if gas prices inch back up. “The market has moved on tremendously,” Marchionne said. “We think that is a permanent condition, especially as mileage improves on these vehicles.” He foresees a time when consumers won’t distinguish between a pickup or SUV and a sedan on mileage. And given a choice, the sedan will lose.

To that end, Marchionne is focusing U.S. resources on trucks and utility vehicles. He announced earlier this year plans to stop making small cars; it’s work he wants to contract out. In Geneva he said he is in discussions with potential partners to build the lower-volume Chrysler 200 and Dodge Dart.

“There are discussions going on now. I think we will find a solution. We continue to talk. It’s both a technical solution and an economic one. We need to find a solution that works economically.” The work will go to someone “who is better at it than we are and who has got capacity available,” Marchionne said. “We’re not the guys who are going to do the manufacturing of the car.”

Conversely, the Ram brand needs to expand, and FCA is considering a return to the midsize pickup market. “We’re looking into it,” Marchionne said. “I have a keen interest in getting it done. The big question is whether it should be body-on-frame.”

FCA has explored the idea of a unibody lifestyle compact pickup for years, but it must be high-mileage and affordable. The business case is still tough—Marchionne figures the Chevrolet Colorado has lower profit margins than General Motors’ full-size pickups because the costs are likely similar but the smaller trucks sell for less. Even so, “I think it’s a good place to be,” he said. “Ram needs to expand its lineup.” **Alisa Priddle**

“We postponed the launch of vehicles, and there is a difference.”

LONELY Product delays have kept the Alfa Romeo 4C (right) from having much company in showrooms as buyers await the Giulia.





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Your Say...

READERS' THOUGHTS ON PAST ISSUES

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Asking for a Friend

Subject: Police vehicles for 2016. I was wondering when will you guys do an article on police vehicles so we can get a possible heads-up on who's behind us when we're driving?

BYRON RIECKMAN
SIOUX FALLS, SOUTH DAKOTA

We usually know once the strobe lights get real close to the rear bumper. But it would be informational to gather up the latest crop of law enforcement vehicles and scrutinize the first (and not back) rows. —Ed.

Reader Recs

Re: Corvette top noises ("Garage," March 2016). Please tell Christian Seabaugh that unclamping the rear clamp on the targa top should end the noise. This lets the back of the top float so it's not trying to be a structural part of the flexible Corvette body! We are on our third C6, and they all have the same problem.

BOB KERNS
VIA THE INTERNET

Other reader submissions pertaining to fixing the long-term Corvette's squeaky top ranged from greasing the targa pins to making the engine and exhaust louder in order to overwhelm the creaking. Perhaps future 'Vettes won't squeak at all?—Ed.

Say "Ahhh"

Your recent First Test/2016 Toyota Prius article ("Crossroad of Contempt," March 2016) pictured but did not elaborate on one of the most visually painful features of the new hybrid. Every interior, no matter what color/fabric choice, comes with ultra-high-gloss white plastic on the center console and steering wheel. In such a futuristic car, this eye-watering interior addition reminded me of my childhood dentist's spit sink, which made me open wide and say "Nahhhhhh." After owning two Priuses, I bought a Honda Civic instead.

PHIL WESSON
WHITEFISH BAY, WISCONSIN

We'll never know for sure, but maybe appealing specifically to oral care professionals was part of Toyota's master plan. —Ed.

LETTER OF THE MONTH

Crowd-Pleaser

Re: Track Drive/Volvo WTCC Polestar S60 ("Tossing Caution to the Wind," March 2016). Thanks for waking long-dormant memories in this old man.

In 1964, I was a young Air Force officer stationed at Lowry AFB in Denver and racing my highly modified 1964 Volvo 544 in SCCA B Sedan class. Although my Volvo dynoed with more horsepower than the XKE Jag, it was also my daily driver. On race weekends, I would jettison all the weight I could, swap my whitewalls for Goodyear Blue Streaks on wide Chrysler rims, and drive to the track, in this case some 200 miles to Aspen Raceway.

Standing in the pits with the spectator who had volunteered to be my pit crew, we watched a large tractor-trailer drive in with North American Racing plastered in huge letters across the length of the trailer. A crew carefully parked a race-prepped Volvo 122S, along with stacks of tires. This car had set the world speed record for under-2.0-liter sedans at Bonneville.

Later that day, although the other Volvo and I were one and two on the starting grid, the 122S easily outran me to Turn 1 and disappeared around Turn 2. When I reached Turn 3, the 122S was off the track to the right, forced to wait while the entire pack went past before he could re-enter onto the track. On the last lap of the race, the 122S finally caught up with me.

I had an advantage, though. I had driven this track before and knew the final turn defied logic. I knew not to set up for the obvious apex, but to stay in the center of the rise up-and-down right-hand sweeper. When I did, the 122S thought he saw his chance to cut inside and out-accelerate me to the finish. I watched him in my mirror as he slid off the track into the rubble, fish-tailed back onto the track, and continued fishtailing down the straightaway even as I crossed the finish line. David 2, Goliath 0.

FRANK DOUGHERTY
CHAPIN, SOUTH CAROLINA

We often receive letters questioning why we bother testing on road courses. Letters such as this remind us there are readers who can relate to the experience. Even in Volvos. —Ed.

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6.16 TREND

DESIGN MOTTO OF THE MONTH

"Smooth equals beautiful and timeless."

Objectionable Style

Readers told us what they thought of the 2018 Lexus LC 500's styling ("Moment of Inertia," March 2016). They were critical, determining it "looks like a stepped-on frog with hoof-and-mouth disease" (Richard Draper, Lincoln, Nebraska) or made "a full-bloom baboon's butt [a] Michelangelo in comparison" (Carlton McCrary, Montrose, Colorado). The kindest remark: "My 1992 Lexus SC 300 profile versus the 2018 Lexus LC 500 profile is more than a little similar" (Tony Correa, Edgecomb, Maine). That's good, right?—Ed.

9 Hole

I thoroughly enjoyed your review of the new 2016 Mazda CX-9 in the March 2016 issue ("Three Rows & A Baby Turbo"). Mazda has been in the back of my mind for more than 40 years, although we haven't owned any since our rotary-powered '72 RX-2 and our '74 rotary pickup. Your review has sparked that old affinity for Mazda engineering and build quality. This new CX-9 appears to have everything my wife and I need, and maybe

much more. We are trying to figure out how to make good use of those two cupholders under the hood in the cosmetic engine cover. It looks like one hole is sized for a fat cup of Joe and the other for bottled water. Any recommendations?

**DAVID L PAUL
SAMMAMISH, WASHINGTON**

In a fictional world, that'd be where proponents of large-displacement engines add cubes on a whim. (The holes service the engine oil.)—Ed.

Hubby of the Year

My dear 88-year-old wife has wanted a Mustang for years, so when her 15-year-old Cavalier wouldn't go, I got her one. I haven't driven it yet. I hate that electronic fob that is the key. I'll probably never buy another vehicle that doesn't use a real key to operate it. I'll keep the Cavalier repaired and drive it and my 10-year-old Colorado.

**HAROLD WEINBAUM
FORT MITCHELL, ALABAMA**

In our next lives, we want to be married to you.—Ed.



READERS ON LOCATION

STARSTRUCK Here stands subscriber **Christopher Vasquez** with his children, Cristofer and Natalia. Along with a sizable starfish. Having sallied out to the Dominican Republic, Vasquez writes us, "Approximately 10 miles off the southeast coast of the town of Bayahibe is a 3- to 4-foot deep 'pool' area about 800 feet in diameter with starfish galore." Of course, he credits wife Maribel for the picture. "What a great time and place to snap a photo with my smartphone! Honey, thanks for not dropping the phone."



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THE APPLE CAR

GLASS CEILING

Future automotive glass will provide expansive surfaces for augmented-reality projections. Headlight duties are handled by a wraparound light band below the Apple logo; surfaces meet in a beautiful, Apple-like manner.

Hello

Words Kim Reynolds



It's a moment we've all had with an Apple product. When the ordinary awkwardness between you and an electronic device becomes a relationship between you and a friend. Mine happened way back when I used an early Compaq computer. The keyboard clacked. You typed things that looked like C:\>find /V into DOS. And stories extruded across a murky screen in a green, constipated font. Then a friend let me use this thing called a Macintosh while she was away. I slowly circled my right hand to get used to its strange, plastic clicker-box.

Suddenly, the screen blinked "Hello." In script.

I'm not sure if I said hello back, but I might have. Encounter by encounter, Apple has woven a series of obtuse electronic tools into the fabric of our lives. How many times has somebody held up their iPhone and said, "This IS my life!" The automobile of today is a Compaq computer. And Apple knows it.

Steve Jobs knew it way back in 2008, too, when Apple was at an early iPhone crossroads. What to focus on next? An electric car reportedly shared the short list with the maturing multi-touch smartphone. Given Cupertino's less formidable, 2008-era resources, Jobs' final pick proved insanely right: Its iPhone-fueled piggybank is now a brain-boggling, \$216,000,000,000. That's BILLION dollars, as Carl Sagan used to eccentrically over-pronounce it, stashed all around the world. What's that mean to paycheck-to-Taco Bell types like us? It's enough to purchase all the stock of GM, Ford, and Fiat Chrysler. Combined. And then buy Detroit again. Some of Apple's shareholders have been clamoring for Cook and company to snap up Tesla with its loose change.



▲▲ Do you remember when you were a kid, and Christmas Eve, it was so exciting, you weren't sure what was going to be downstairs? Well, it's going to be Christmas Eve for a while."

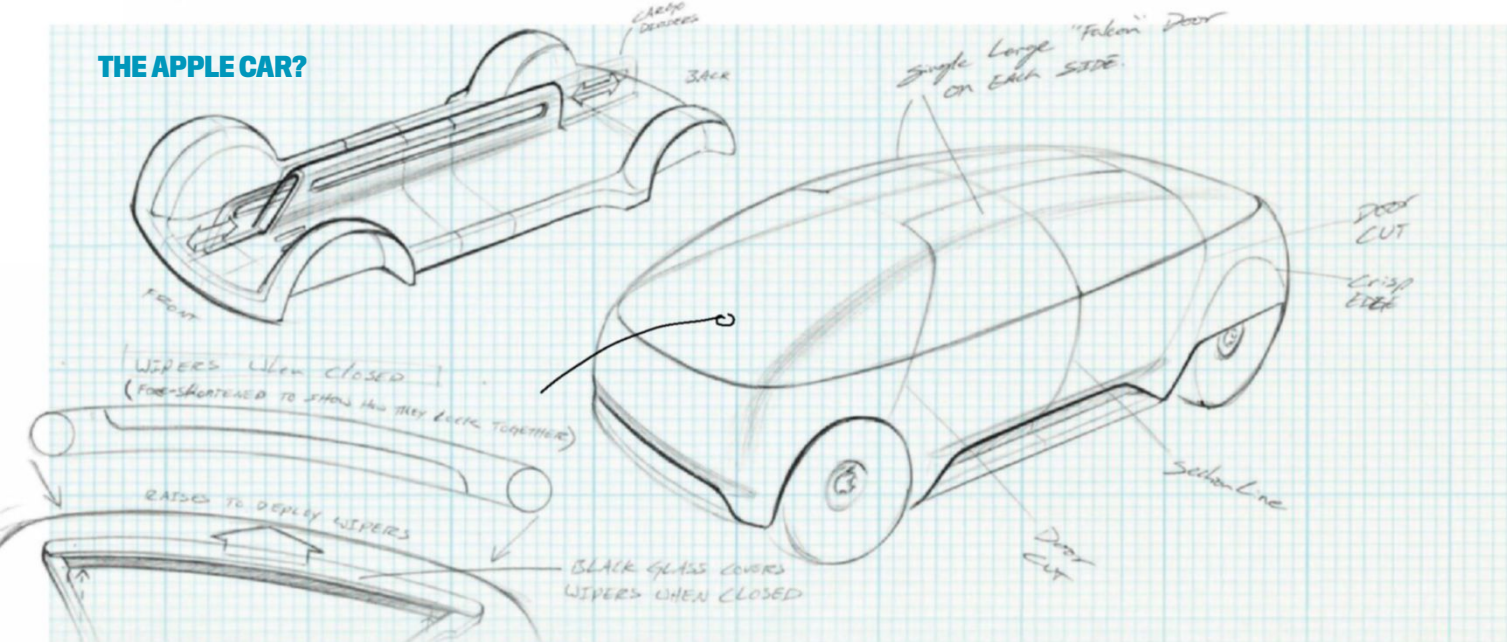
APPLE CEO TIM COOK, after being asked about an Apple Car at a February 26, 2016, shareholders meeting.

LINE OF SIGHT

Visible from any angle, a light strip wraps the shoulder line to signal to vehicles and pedestrians. Eliminating access to the motor means fewer cutlines; Apple users don't work on or repair their products.



THE APPLE CAR?



And sometimes, Apple has nonchalantly jangled that change. In late 2013, Elon Musk met with Apple's head of acquisitions and later huddled with Jony Ive, Apple's chief design officer, at a post-Oscars party. Adding to the warm visuals, Laurene Jobs returned her husband's famously plateless Mercedes-Benz SL55 AMG, getting a Model S. But Musk doubts an Apple deal will advance his goal of creating a compelling mass-

APPLE SEEDS
Initial sketch work begins to take shape. It features simple, seamless surfaces with minimal shut lines and an emphasis on truth in materials.

complex in Sunnyvale, California. Operating under an apparent shell name, "SixtyEight Research," employees have supposedly been told to turn around their Apple name badges (which already have their Apple logos deleted). Security guards are deflecting looky-loos, and the locals are complaining about late-night motor noises.

And then there's the autonomous rumors. Apple has pored over the fine points of self-driving regulation with the California DMV. It's supposedly negotiated use of the nearby GoMentum Station (the repurposed Concord Naval Weapons facility that's now the nation's largest secure autonomous-focused test site).

Early sightings of a camera-festooned Dodge Grand Caravan sparked speculation that the van was actually an autonomous prototype. Apple made a rare comment to quell the chatter: wrong, everybody. They're just compositing their own version of Street View for Apple Maps. So maybe the car isn't a minivan. Then what is it?

In September 2015, the car was allegedly raised to "committed project" status with a 2019 release date, presumably meaning its design completion. But after a program review, Ive "expressed his displeasure." Reportedly, it's not moving fast enough. The program's in disarray. Its goals are unclear. (Meanwhile, management's been accused of unrealistic targets). Ive froze the hiring spree that was projected to spiral toward 1,800. And program head, Steve Zadesky—

market EV. "I don't currently see any scenario that would improve that probability," he said.

As Apple's code-named Project Titan has inhaled Silicon Valley's brightest car brains, it's left enemies swirling in its wake. The tug-of-war has grown tense with Tesla, with Apple's rumored \$250,000 signing bonuses and Musk's famous, "We always jokingly call Apple the 'Tesla Graveyard.' If you don't make it at Tesla, you go work at Apple. I'm not kidding." At a recent press dinner in Palo Alto, I sat next to an executive with a German brand who heads an SV tech center. "We're battling to hang onto people," he said after a few drinks. "Recently, we actually hired somebody back from Apple. It felt like a victory."

An estimated 1,000 people are thought to be working at an Apple

In September, the car was allegedly raised to "committed project" status with a 2019 release date.



PENCIL MAN
Our designer was ArtCenter grad student Garrett DeBry, seen here sketching during our brainstorming discussion. Oh, and he also helped write these captions.

HALLOWED HALLS
Work by greats such as Chris Bangle and Frank Stephenson once lined these walls.

THE FUTURE OF MUSCLE



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THE APPLE CAR?

16 years with Apple after a stint with Ford—resigned, though it's said to actually be for personal reasons.

Ive, the world's most celebrated industrial designer, is the Cupertino Car Czar. Once tempted by a Royal College of Art's automotive class, he instead chose industrial design at Newcastle Polytechnic (now Northumbria University) and later became Jobs' right hand. And what does he drive? A Bentley Mulsanne and an Aston Martin DB4. His design co-conspirator, Marc Newson, penned Ford's 1999 021C concept for J Mays and curiously also owns an Aston Martin, a 1929 Bugatti, a '50s Ferrari, and a Lamborghini Miura. (Another Apple designer, Julian Hönl, worked at Lamborghini.) These are impeccable-taste, Goodwood-attending, genuine car guys. And Newson, for one, has a dim view of current automotive design. Per a Wall Street Journal interview, "There were moments when cars somehow encapsulated everything that was good about progress. But right now we're at the bottom of a trough."

To get a higher vantage point on all this, we traveled to the hills above Pasadena, California. The ArtCenter College of Design's famous Hillside Campus is a giant beam-and-glass shoe box designed by Craig Ellsworth, dropped in an arroyo above the Rose Bowl. Here, childlike scribbles flower to sophisticated artistry. Within is a curriculum that's so influential that it's essentially become the international epicenter of automotive design. We're at its far end, sprinkled around a table.

On my left is Stewart Reed, ArtCenter's chair of transportation design who recently envisioned the bodywork of Peter Mullin's unfinished Type 64 Bugatti. Tim Huntzinger, professor in graduate transportation systems and design, has worked for Fisker, Rivian, and Daqri, an L.A. augmented reality company. Tim Brewer, a faculty member and an inventor of the first mouse scroll wheel. Di Bao is a Chinese national specializing in interiors and now interns with Volkswagen. Akash Chudasama, a recent



CANDID CAMERA
Rearview cameras below the beltline replace side mirrors, improve visibility, minimize drag, and simplify exterior aesthetics.

COLOR CODED
The light bar can be a turn signal or show awareness of pedestrians or bicycles.

BLACK MAGIC The dark rocker material break line gives a more athletic stance to indicate that the vehicle has not sacrificed traditional automotive performance.

More industry insiders opine on the Apple Car



Larry Burns
Former GM vice president of research and development and head of strategic planning, and current adviser to several companies shaping the future of mobility

The word "and" is more important when it comes to the future than the word "or." Mobility is transforming because connected and driverless and shared and tailored and electrical vehicles are converging to provide better mobility experiences at significantly lower consumer and societal cost. A combination of new technology and innovative business models is driving this change. Both a new age of the automobile and a new age of mobility are rapidly emerging where people will personally own and share driverless vehicles.

Over the years I've seen Apple's strong tendency to change the

design language of the incumbent solutions. For example, the iPhone dramatically changed the design language of the BlackBerry. I am speculating that Apple is not just seeking to make a better Tesla, but aiming to change the design language of automobiles based on what is now technically possible.

It will likely be electrically driven, it will eventually be driverless, and it will probably entail both personal ownership and sharing. Think Uber without drivers and vehicles tailored to the types of trips people typically make, not the extreme trips we rarely make.

Auto companies are good at what they do, and I don't think we ought to jump to the conclusion that they're out of the game by any means. But do they need to step up their pace on Level 4



autonomous? Absolutely.

Google had the foresight to hire 15 scientists and engineers from several of the DARPA Urban Challenge teams. Then last year, Uber hired numerous experts from Carnegie Mellon University. Why didn't an auto company do this instead of two technology companies? That worries me on behalf of the OEMs because there are only so many people who can do this well. I think we're within a three- to five-year window when commercial Level 4 autonomy—a car that doesn't have a steering wheel—will be proven to the world.

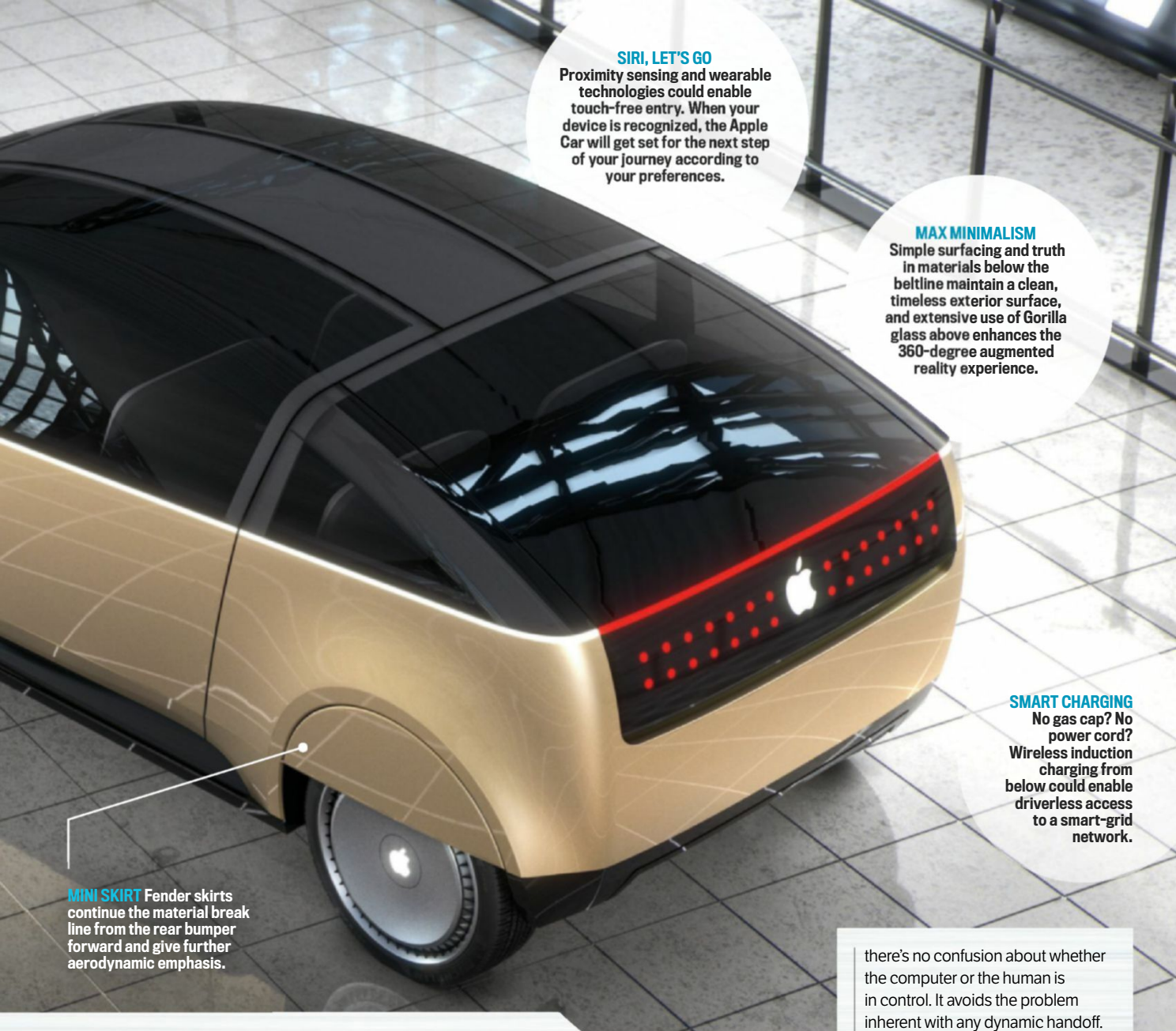
In the past seven years, new car efficiency in the U.S. has gone up at about 0.6 mpg per year. To get to a 54.5 mpg CAFE by 2025, fuel economy must improve almost three times that rate for 10 years. OEMs risk using all their resources to meet fuel economy and emission regulations to preserve legacy cars

and trucks while competing with companies such as Apple, Tesla, Uber, and Google, which are developing transformational technology, business models, and designs. This is a big challenge for automakers.

Encouraging signs for the OEMs include Ford's 25 Learning Projects and Smart Mobility Division, GM's investment in Lyft, an impressive Chevrolet Bolt with 200-mile EV range, and Toyota spending a billion dollars over five years at its recently announced Toyota Research Institute (analogous to Xerox's famous PARC in Palo Alto).

Are Apple, Google, Uber, and Tesla intimidating competitors? Absolutely. These are rich companies with great talent, and they're proven. I think it's going to be a great race.

"These are rich companies with great talent, and they're proven. I think it's going to be a great race."



SIRI, LET'S GO
Proximity sensing and wearable technologies could enable touch-free entry. When your device is recognized, the Apple Car will get set for the next step of your journey according to your preferences.

MAX MINIMALISM
Simple surfacing and truth in materials below the beltline maintain a clean, timeless exterior surface, and extensive use of Gorilla glass above enhances the 360-degree augmented reality experience.

SMART CHARGING
No gas cap? No power cord? Wireless induction charging from below could enable driverless access to a smart-grid network.

MINI SKIRT Fender skirts continue the material break line from the rear bumper forward and give further aerodynamic emphasis.

Chris Borrone-Bird

Qualcomm vice president of strategic development, former GM director of advanced technology vehicle concepts and EN-V program

What any company in this space is trying to do is come up with something that's compelling in terms of design and user experience; an example is the integration of the smartphone ecosystem, the Apple Store. That was a differentiator in that space. The rest of the vehicle is going to be, I shouldn't



say commoditized, but it's not going to be the prime differentiator. However, the ability to provide an extremely comfortable ride and

avoid bumps so people can read without getting motion sickness is going to become more useful. At the moment, though, there is a constraint on the number of software engineers. That might lead car companies to pool resources.

In the future, there may be a tendency for vehicles to be leased due to cybersecurity. It's one thing to do regular software updates, but at some point, the hardware may be a limiting factor. As attacks get more sophisticated, I think the OEMs might have an interest in the vehicle coming back so they can upgrade it. It may be less risky to just lease them.

I'd also mention that wireless EV charging is a natural fit with automated parking and shared mobility—no need to plug in and

fewer cords in public parking spots. When charged it can move aside to let another vehicle charge, so the same charging pad would have close to 100 percent utilization, saving substantial infrastructure cost. Today, a charged EV can be parked for days at the airport, which is very inefficient.

John Krafcik

CEO of Google Self-Driving Cars, former director of TrueCar, former president of Hyundai Motor America



Our focus is full autonomy with no driver intervention or monitoring required. This will benefit the most people, and

there's no confusion about whether the computer or the human is in control. It avoids the problem inherent with any dynamic handoff.

There's much to do to improve automotive safety. Over 1.2 million people die on the world's roadways every year. That's like a 737 falling from the sky every hour of every day. Based on U.S. statistics, over 90 percent of the time, driver error is responsible. Ultimately, I think there will be a greater mix of how people want to get around.

But we're not looking to manufacture cars at scale. Getting 1,500 kilograms of steel, aluminum, carbon fiber, plastic, and rubber to perform robustly in temperatures from minus 40 degrees C to 60 C at speeds up to 200 kilometers per hour or more—while delivering zero tailpipe emissions and a 500-km range—is insanely difficult. Automakers have both the experience and smarts to do this well.

"There's much to do to improve safety. Over 1.2 million people die on the world's roadways every year."

THE APPLE CAR?

GRAND OPENING

Approaching the Apple Car would be like walking up to an amazing store in Tokyo. The way the door opens up and presents isn't as a door you grab, but a roof that raises and you walk in.

LIGHT AND MAGIC

Various levels of indirect and ambient lighting enhance a curated, premium atmosphere based on your preferences.

CREVICELESS

Intended for shared-use, interior surfaces have simple radii to reduce the likelihood of losing something or leaving it behind. No crevices for Cheerios to get stuck in. Steer-by-wire will disappear when full autonomy appears; the steering wheel shape is the Apple-app "squirrelc."

eucalyptus wood is cool, but if you count them, there are 35 different materials in your field of view."

Reed takes the high ground. "I just got out of a meeting with a manufacturer who is now calling their designers 'experience designers,'" he says. "Their team sounds like a movie crew: acoustics, haptics, interpreters. To me, that would be an Apple approach."

How about car-sharing? Apple products have always been premium. You spend more to have them, and you prize their finish. Besides the obvious reason—saving money—why would you share your car if you wouldn't share your phone?

Stewart: "That's a question we've spent 14 weeks discussing with another manufacturer—how do you share a premium product?"

Chudasama: "The car would be ownable if you want to own it, but the real value of the phone isn't the hardware but in its apps. Traditionally your connection to a car is through its steering wheel; now it might be more about how the total transportation experience makes you feel." Eyes turn to a sleek MacBook Pro on the table; you feel good without even touching it.

PRIVACY DIVIDER Seats side-mounted to a central tunnel rather than traditional floor tracks create a seamless, clean floor space and free up footroom while providing a sense of comfortable privacy in a shared-use context.

grad student with an aerospace engineering degree, has interned at JPL. On my right is Garrett DeBry, who's intrigued by personal mobility and would become our Apple Car designer of record, folding the group's ideas together and placing them in his own imaginative envelope to create the images you see here.

OK, everyone—imagine Apple is our client. And we're going to brainstorm what its car will be.

"My iPhone has become my social life and my career life," Chudasama says. "I don't really use this to make calls. I use it for everything else. So if they can make a telephone—something that's been around a hundred years—part of your way of life, what will they do with a car?"

"You tell me," I reply.

"It'll be your entire way of life," Chudasama says. "And probably also the walled garden that turns some people off but others want for the impeccable experience someone else has anticipated for you. Tesla is kinda there; the BMW i3 isn't there yet, but aesthetics aside, it's a really easy-to-use car, simple to get into its back seat."

There's immediate dissension. "I totally disagree," Huntzinger says. "The i3 is Windows. They've crammed too much functionality into the vehicle, so it actually gets in the way of the experience. The

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Words Alisa Priddle

Lie down until the feeling passes



Apple needs its next big thing. An iCar would do it. But becoming a full-fledged automaker is too big a bite of the apple for the Silicon Valley company—at least that is the opinion of automakers that have been developing, building, and selling cars for a century and know it to be a difficult and complex industry.

“The advice that I’ve given them is if they do have any urges to build a car is to lie down and wait until the feeling passes,” Fiat Chrysler CEO Sergio Marchionne said. “Illnesses like this come and go, and you can recover from them; they are not lethal.”

Details have been leaking out about Apple’s Project Titan and the secret testing facility in California. There are indications that the workforce and investment behind the project continue to grow, but there are also reports that the team is finding out that entering the car-building business is a herculean task.

Those already in the car business are inclined to believe Apple CEO Tim Cook when he told *Fortune* that Apple has teams exploring ideas constantly. “We don’t go into very many categories. We edit very much. We talk about a lot of things and do fewer. We debate many things and do a lot fewer.”

That is not to say Apple does not want a bigger role in modern cars that rely on millions of lines of code and have become an extension of today’s smartphones and other devices. Autonomous driving will only increase the reliance on software.

“They are the kings of software and have a lot of strong people,” said Darin Gesse, marketing manager for Chevrolet’s electric Volt and Bolt. “I wouldn’t put anything past them. Who would have thought Apple would have a watch?”

Advanced technology is extremely important,

but the real estate the technology goes into—the vehicle itself—is fundamental, said David Cole, chairman emeritus of the Center for Automotive Research. The danger: “You can spend billions to develop a new vehicle and not be able to develop something unique and desirable enough.” And it is hard to be unique when every major automaker already has electric and semi-autonomous vehicles. “If I were at Apple,” Cole said, “I would sit down with Sergio and say, ‘Let’s make a deal here,’ and we’ll get real estate for our technology.”

Marchionne’s response: “I don’t know that it makes sense to partner (as co-automakers).” But if Apple recognizes carmaking should not be part of its core business, “it makes sense to partner in terms of what we do for a living and their ambitions in the automotive space.”



Steve Wozniak

Apple co-founder, in a Reddit AMA, March 2016
 “I think we’re really going to improve life a lot with [self-aware cars], and that’s where Apple likes to be. Basically making products that make a better world for the users. So the car market makes total sense to me for Apple, but the important thing is that I hope if they get off on a product, something they could sell and make a lot of money for but is not ‘insanely great,’ as Steve Jobs would say, Apple should drop it and start over. ... I think that’s good if Apple says, ‘We’re not making the product that is going to stimulate all of humanity; that’s not our business as Apple. We don’t want to just be another self-driving car.’”

“I think we have all lived through the excitement of being in the car business,” Marchionne continued, but it is a complex industry with too many players spending too much capital. “I think there’s even a bigger problem about getting somebody who is not in the business to come in here and occupy the space and start all over again. There’s available capacity in the system to try to deal with your requirements, so use somebody to get you there.”

Cole agrees the business is overpopulated and it would be hard to make a dent unless you bring something totally unique, which is even harder if you are partnered with an existing automaker or trying to play catchup.

Tesla is a successful newcomer, but the business model has not yet been tested with high-volume affordable electric cars, and the Chevy Bolt is expected to beat the Tesla Model 3 to market. CEO Elon Musk has invigorated the industry, but “I don’t understand the business model,” Marchionne said. “I can’t make money building a car like the Tesla.”

Creating a new car is a long and expensive goal. It can take four or five years for an established automaker to create an all-new vehicle, and that is with a century of expertise and an established network of suppliers. A newcomer could face a lot of regulatory scrutiny.

Starting from scratch could cost \$10 billion to get a car on the road, Cole estimates.

“Once we start spending gobs of money—like when we start spending on tooling and things like that—we’re committed,” Apple’s Cook has said. Last year Apple spent about \$2 billion a quarter on research and development, but it could be earmarked for a number of projects.

If Apple wants to provide autonomous driving, it is competing with car companies and auto suppliers that have been developing the sensors and technology for more than a decade and putting aspects of it on the road. Lex Kerssemakers, CEO of Volvo Car USA, said the Swedish automaker will have 100 autonomous vehicles in the hands of customers in Gothenburg by the end of 2017, and he believes Volvo will be first to do so. He thinks the technology will go mainstream after 2020.

BMW’s Vision Next 100 concept provides a glimpse into its vision for autonomous driving 20 years from now. CEO Harald Krueger described companies like Apple and Google as competitors in the future even though BMW has been mentioned as a possible partner.

Google has said it is more interested in supplying the brains of a car and partnering with automakers to provide the rest. Even Uber is getting more into it with plans to add another research building to its growing campus in Pittsburgh for R & D on advanced technologies for autonomous vehicles. It all adds up to a lot of competition for Apple. ■

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WRAPAROUND entertainment projections appear below the window line as the steering wheel is released and autonomy is engaged. Above it, augmented reality remains journey-focused to enhance safety and provide location-based information.



DeBry: “The advertisement for the iPod was a black silhouette jamming to music, and that sold the whole thing. A car that comes to mind was Volvo’s YCC Concept that was designed by women for women. It even had a hole in its seat for a ponytail. That’s really anticipating use cases. The core experience of an Apple vehicle is that it’s as easy to use as possible.”

Might the famous Apple ease of use be particularly suited for countries with developing driver populations, such as China? “Owning a car in any city is a pain, so an Apple Car could make urban transit simpler, Huntzinger says. “With iPhones in the pockets of many non-Apple Car drivers (and pedestrians), the whole urban system could be communicating with itself.”

Reed taps the brakes on this thinking. “I feel many of us are getting too focused on the rise of urbanization,” he says. “Remember, the best-selling vehicle in the country is still a Ford F-150.” But an autonomous future could blur these lines; you could sleep on your way home or start to work on the way in.

DeBry: “People historically travel for about a half-hour—whether it’s by foot or horse or car. But an autonomous model could change that. Apple could sell this as giving you a half-hour of your life back. It’s a time machine, particularly valuable as careers become more immersive.” My caution not to get too optimistic about autonomy’s timeline proves futile.

Herding cats, I ask again: So what’s the Apple Car? Stewart: “It’s the old-time, really great family chauffeur who knows the family, knows

your schedules.”

Chudasama: “It could be more of a tiny, mono-shaped minivan.” Minivan? “No, we’re talking about a premium mono-volume.” Sketches start to appear on the dry-erase board.

Brewer: “Sleek metal—the mono-volume doesn’t have to have those minivan stigmas.”

Reed: “And the future of automotive glass isn’t laminated safety glass. It’ll be in the realm of hard-coated polycarbonates that allow expansive glass surfaces for augmented or, as I prefer to call them, ‘merged-reality’ projections.”

Time to pin the group down. Going around the table: What would your Apple Car look like? “I would start from the inside out,” Bao says, “with usability coming first.”

Brewer: “What’ll be most striking will be the quality of its parting lines, how materials come together. The big gaps on current cars make them seem dated.”

Chudasama: “It’ll be a mobility device. A way of life. It won’t be taking cues from an animal or something. Rather, it would be honest to what it really is. It’s not faking its meaning.”

Huntzinger picks up on that. “Those haunches and big wheels are old memes we use just because people think they’re valuable,” he says.

Chudasama: “The new premium is ‘convenience’. We want our time back. That’s the most valuable thing we have.”

Huntzinger: “I think it’ll look like a blend of Toyota’s MeWe concept



I SEE YOU Highlights of people and vehicles are subdued—their purpose is to give the occupants confidence that the car sees them rather than acting as driver alerts.

Apple of Your Eyes: The Windshield

If the iPhone 6 screen is the Mona Lisa of multitouch, an automobile's windshield and dash would be a blank Sistine ceiling. But what should it look like? Google has amassed its fortune by connecting search-related advertising to people sitting at their desks. Transplant that idea into a car, and it becomes the moving world as seen through Apple's eyes.

Approaching the Apple Car with your phone or watch pre-positions the seat and mirrors. The climate control prepares your cabin temperature. Your music swells. The door rises. You climb in. The dash—smooth, featureless leather that notably lacks today's electronic screens—suddenly brightens with projected displays. A Siri avatar greets you. “Hello. Any errands on our way to work, Bob?” You're still a bit sleepy this morning, so you reply, “Starbucks.” Siri: “OK, I'll call in your grande latte. But let's go to the one on Fifth Street instead. There's construction on our normal route.” The

dash's graphics are swipable and expandable with only the simplest instruments because electric drivetrains no longer need monitoring. You can even toss some graphics up onto the augmented windshield. Made of Corning's thin automotive Gorilla glass, it's wraparound to maximize the augmented field of view. “Siri, I have a lot of work today, so I'll need to eat at my desk again. Any ideas?” Siri: “I sense that you've gained four pounds recently despite our going to the gym three days last week. Your Facebook friend Jill, who has similar tastes, liked a cucumber salad at the Blue Garden Cafe that's right along our way. I'll highlight it as we get close.” Beyond downloading entertainment from iTunes, the car will be a personal assistant. And one Apple might hope you adopt for your non-driving time, as well. An augmented reality “windshield” is among the most persistent Apple Car rumors and thought to be the likeliest part to survive if the rest of Project Titan is canceled. **KR**

“The vehicle will become an extension of your Apple device.”

Garrett DeBry, designer of *Motor Trend's* imagined Apple Car

ENDLESS POSSIBILITIES As new car models hit showrooms, physical screens can already be upward of three years outdated. Projected visuals and information are always state-of-the-art.

and Marc Newson's Ford O21C concept. There's a trend toward super-organic forms—and some can be timeless, but in five years we'll know exactly when they were made. Apple's really good at finding ways to ride that line between exciting without having a timestamp on them.”

Reed: “The glazing would be beautiful, well-proportioned with some automotive cues that look sure-footed and capable, not cutesy. Approaching it will be like walking up to an amazing store in Tokyo, the way the door opens up and presents isn't a door you grab but a roof that raises and you walk in.” DeBry is starting to sketch.

The response of most carmaking veterans to the Apple rumors has been one loud harrumph. Lighting up a La Libertad Robusto cigar, he puffs smoke and growls, “Cars are very complicated. These software guys will never figure out how to build them.” PayPal co-founder Elon Musk has. And in the same manner Google is expected to collaborate with Ford, Apple will probably contract it out. Last year, Tim Cook visited the BMW i3 plant in Leipzig, Germany, that's pioneering the mass production of carbon-fiber chassis, and reps also toured Magna-Steyr, a contract builder of premium (sometimes aluminum) cars in Austria. Either way, it makes sense that Apple outsources the manufacturing intricacies overseas (iPhone/Foxconn-like), avoiding U.S. taxes that could take upward of a 40 percent bite from its overseas war chest.



“Well, maybe,” our archetypal veteran barks. “But,” as the stogie lolls between his molars, “Apple is used to fat profits. Car margins are paper-slim. They'd be crazy to build cars.” Apple's margin was about 40 percent last year. But making smartphones is intensely competitive, too, and its \$53.4 billion profit in 2015 reflects strategies that legacy car companies should study, not dismiss. However, we're being presumptuous of the Apple Car's business model.

ZipCar and Uber are the early breezes of a cyclone of shared use/ownership that's readying to blow the industry's spreadsheets right off their monitors. Replacing single-user ownership with a shared model could collapse your get-around costs. A recent Deloitte study projected our typical per-mile travel costs (that's all-inclusive) dropping 70 percent for shared, fully autonomous vehicles. Meanwhile, a manufacturer that retains ownership could charge for all that way-greater use while simultaneously building far fewer cars. Among Apple's notable hires is Rónán Ó Braonáin, who comes from Reviver, a company developing digital license plates and vehicle-to-vehicle networking. It's been noted that shared use might need plates that identify both the car and its current driver.

Yet all this might be missing something bigger. Although making ever-more billions is surely motivating, many Cupertino watchers have been wondering if the Macintosh magic is fading since Jobs' death. The iPad has slumped. The Apple Watch is, well, a nifty watch kinda thing. Android is slowly turning its bread-and-butter smartphone into a commodity—like soft drinks are commodities. Back when Jobs was romancing Pepsi's John Sculley into being Apple's CEO, he famously asked, “Do you want to sell sugared water for the rest of your life? Or do you want to come with me and change the world?” For Cook and Ive, an Apple Car might be the answer to Steve Jobs' question about themselves.

Hello, gentlemen. ■

MERCEDES'
HEARTBEAT
REMAINS
STRONG

STEADY AS SHE GOES

Words Jonny Lieberman





I've had many a wild taxi ride in my life; it's the hidden cost of constant travel. From seeing 110 mph in the back seat of a Crown Vic on FDR Drive in Manhattan to a dude actually turning and saying "chicane" in Palermo, Sicily, after taking a traffic circle like Fernando Alonso, I've survived more than my share of cabbie-induced nonsense. The craziest, however, occurred almost 19 years ago in Lisbon, Portugal. The cab was a Mercedes-Benz W124 E-Class, the transmission was a five-speed manual, and the driver felt he was Ayrton Senna. Or at least related to him. I'm not sure if I've ever

witnessed more needless downshifting in my life—maybe in the first "Fast & Furious" movie—but once I realized death wasn't in fact imminent (the guy was pretty good), I remember thinking what a cool taxicab the midsize Mercedes was.

Funny thing happened as I exited the Lisbon airport to attend the launch of the latest and (Mercedes claims) greatest E-Class, the fifth-generation W213. The cab turned out—shocker—to be a last-gen E-Class, a W121. Apropos, no? If the S-Class is the jewel in Mercedes' crown, the E-Class has long been the crown itself. From 2010 to 2014, the E-Class sold more



FAMILY CAR

If you think the all-new E-Class looks like the S-Class and the C-Class, you're right. It does. Still, kinda handsome, no?



than 60,000 units annually in the U.S. In 2015, customers picked up 49,736 W212s, a respectable number for an expensive car in its final year of full production. The E-Class is Mercedes-Benz North America's third-best-selling model after the C-Class and the former M-, now GLE-Class. In Europe the E-Class sells even better, averaging 100K units per year since 2010. And yes, many are indeed taxis identical to the one that took me to the hotel. Obviously, replacing a major volume model like the E-Class is no small or easy task. So does the new W213 have any chance at matching its predecessors' success?

Before we answer that, let's take a look at what makes the new E-Class tick. A fine place to start is its looks, and it's safe to say the new car looks better than the last one. Sure, the

E-Class bears an undeniable resemblance to both the C-Class and the S-Class. Intentional, no doubt, but Mercedes has painted itself into the old BMW design conundrum corner: one sausage, three lengths. But hey, it's a decent-looking hunk of meat. Especially in matte. The interior story is largely the same. Feel free to think of the E's innards as a snug S-Class or a marginally bigger C. Either way, the top-shelf design and industry-leading materials continue unabated. The E-Class can be had with a fully digital dashboard that includes three different looks: Normal, Sport, and Eco. Normal looks, well, like a normal speedo and tach, whereas Sport turns the gauges yellow. Why not? Eco moves the tachometer to the center and looks a little too Prius-y for my tastes, though I suppose that's the point. In Normal mode, the virtual tach can be replaced with other info, such as a map.

Initially, the only E-Class we get in the States late this summer will be the E300, powered by a 2.0-liter, turbocharged inline-four good for 241 hp and 273 lb-ft of torque. That might not sound like much, but it's competitive with, say, a BMW 528i (240 hp, 260 lb-ft). Fear not, horsepower junkies, as more potent iterations of the W213 are coming later. Both are badged AMGs. The E43 will have a twin-turbo V-6, and the E63 will

have the brand's 4.0-liter, twin-turbo V-8. We will eventually get diesel and plug-in hybrid versions of the W213, as well. No matter the motivator, power will be routed to the wheels via Mercedes' smooth and smart new nine-speed automatic transmission. The E300 comes with rear- or all-wheel drive, and we estimate it should hit 60 mph in 6.2 seconds.

On the road, the overwhelming impression is one of sturdiness, in the best Benzian sense of the word. The new E rides incredibly well. On smooth freeways I'm hard-pressed to think of a finer-feeling car; I've never thought the current W205 C-Class rides all that great, yet both cars are derivatives of the same MRA chassis. I suspect the E-Class' extra 3.9 inches of wheelbase get the credit for the big improvement. For such a large car, the handling is pretty good, though of course we'll have to wait for the AMG siblings to really see what's what. That said, the back seat is tight. Which is why Mercedes is building a long-wheelbase version for China.

Mercedes has stepped up the E's semi-autonomous game quite well. The system is called Drive Pilot, and here are the big bullet points: The E300 can follow the car in front of it at up to 130 mph. As long as the lanes are clearly marked, you can keep your hands off



SEEING EYE CAR

The new E can see—with a camera—the bicycle and act accordingly, either auto-braking or applying extra torque to the steering column.

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Bigger, lighter, techier, safer, and more elegant, the new E-Class should be quite a hit.



Q&A With Chief Engineer Michael Kelz

Angus MacKenzie The E-Class has been the car that defined Mercedes-Benz for decades. Is it still?

Michael Kelz It's really the core car of Mercedes, and of MRA, the new rear-wheel-drive architecture. MRA is the basis for the C-Class, the GLC, and the next CLS. Some components, plus the electrical architecture, will also go into the next-gen S-Class. From the first day we developed the MRA, E-Class was always the core.

AM The bandwidth of the E-Class range stretches from the Düsseldorf taxi driver's diesel to the E63 AMG. Do the demands of one compromise the desires of the other?

MK There's benefit for every



customer. The taxi driver gets a car that has a light, stiff, and rigid body structure, and the people driving the AMGs benefit from having a lot of components in their cars that are produced in large volumes so are less expensive. Finally, the customer who only does 12,000 miles a year benefits from a car that meets the reliability requirement of someone who does 250,000 miles a year.

AM What gave you the most

sleepless nights during the development program?

MK The new electrical architecture, the new head unit, and the driver-assistance systems, which impact the engines, transmission, brake, and steering functions. The classical engineering—chassis, engine, body—is a lot of work but straightforward. The electrical architecture and systems were a major challenge, especially as they would be the basis for all cars coming in the future.

AM How many E-Class variants can you build?

MK Can't say. None of them are really all the same. We didn't try to calculate it, and I don't know that we will ever build all possible variants.

the wheel. Every now and then a graphic will pop up telling you to grab the wheel, but you can just lightly brush one of the two thumb buttons on the steering wheel, and the car will keep driving forward hands-free. While Drive Pilot is engaged, you can hit the turn signal to change lanes in either direction. Once you're in the lane you want, just cancel the turn signal. In the States the system uses GPS to automatically adjust for posted speed limits, though you can override that (i.e. speed) by pushing up on the cruise control stalk.

Back to our initial question: Is the 2017 E-Class as competitive as the car it replaces? I can tell you the W213 is a proper E-Class. Moreover, it is one well-wrought sedan, regardless of make, model, and badge. Bigger, lighter, techier, safer, better-looking, and much more elegant than before, the new W213 E-Class should be quite a hit for Mercedes-Benz—assuming people are still willing to buy sedans with gas prices so low and not go completely SUV crazy. Either way, Portuguese taxi drivers will be stoked. ■



2017 Mercedes-Benz E300

BASE PRICE	\$54,000 (est)
VEHICLE LAYOUT	Front-engine, RWD/AWD, 5-pass, 4-door sedan
ENGINE	2.0L/241-hp/273-lb-ft turbocharged DOHC 16-valve I-4
TRANSMISSION	9-speed automatic
CURB WEIGHT	4,100-4,250 lb (mfr)
WHEELBASE	115.7 in
L X W X H	193.8 x 72.9 x 57.2-57.8 in
0-60 MPH	6.2 sec (MT est)
EPA CITY/HWY/COMB FUEL ECON	22-23/33-34/26-27 mpg (est)
ENERGY CONSUMPTION, CITY/HWY	147-153/99-102 kW-hrs/100 miles (est)
CO2 EMISSIONS, COMB	0.72-0.75 lb/mile (est)
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2

AWESOME

Words Jason Cammisa

Photographs Robin Trajano



THE SUCCESSOR TO THE 1 SERIES
M COUPE IS A COMPLETE SURPRISE





BATTLE OF THE BULGE
It's between twisty roads and the M2's enormously flared fenders. The M2 wins.



BMW's last surprise hit, the 2011 1 Series M Coupe, was one of those cars that marketing folk don't get. BMW made posters for dealers that actually used the words "all kinds of wrong." The product planners didn't think the car would sell and requested only a couple hundred for the U.S. market.

Then they found themselves pleading for additional production once the enthusiast community stormed dealerships. In all, 739 of those clinically insane rockets were sold here (plus one more to BMW NA itself), which was all the factory could build.

The new M2 is a regular production model, but it follows the 1M Coupe recipe. The M3/M4's suspension is shoehorned into a car so much narrower that its bodysides had to be widened, this time by 2.1 inches front, 3.1 in the rear. The M2's 19-inch wheels are the optional forged ones from the M3/M4, and they also wear Michelin Pilot Super Sport tires, each 10mm narrower than the bigger car's. The brakes, too, come straight from big



brother with fixed calipers (four piston up front, two at the rear) clamping enormous rotors (15.0 inches front, 14.5 inches rear.)

There are, however, big differences under the hood. Rather than fitting the M3/M4's twin-turbo S55 straight-six, BMW kept the single-turbo N55 from the M235i but fitted it with pistons from the S55. These two BMW 3.0-liter straight-sixes share bore (84.0mm), stroke (89.6mm), and compression ratio (10.2:1), but that's it. The M3/M4 sounds like an air compressor choking on concrete; the M2's sings like a BMW engine should: deep,

throaty, and refined. Starting the M2 will bring a sigh of relief from acoustic enthusiasts scorned by recent M engines.

It isn't just sonorous. It's also potent. The M2 is rated at 365 hp, which it produces at 6,500 rpm. Peak torque is 343 lb-ft, available between 1,400 and 5,560 rpm. (Under certain conditions, the computer allows overboost to 369 lb-ft between 1,450 and 4,750 rpm.)

The rest of the M2's driveline is identical to the M3/M4's: the same computer-controlled locking rear differential, the same standard six-speed manual transmission, and the same optional seven-speed dual-clutch auto.

In grand 2 Series tradition, the M2 is shockingly overweight. Despite being 8.3 inches shorter and 0.6 inch narrower than an M4, our M2 weighed only 101 pounds less—and our pre-production Euro-spec tester lacked some weight-adding features that will be standard on U.S.-spec M2s, namely power seats, automatic climate control, navigation, and an upgraded Harman Kardon stereo. We expect the U.S. car to be 75 pounds heavier.

You'd expect the M2, with 60 fewer hp than the M4 and effectively no difference in weight, to be slower. You'd be wrong. It accelerates from 0 to 60 mph in 4.2 seconds, the same as an M4. Also effectively identical to the M4: braking distance (107 feet from 60 mph), skidpad (1.01 g), and the figure eight (24.1 seconds at an average of 0.82 g.). The only significant performance difference happens after 60 mph—the M4 pulls a big 9-mph lead through the quarter mile.

But the race is over before it even begins—the M2 is such a pleasure to drive.

The M2's straight-six sings like a BMW's should: deep, throaty, and refined.



2
AWESOME

RED FANGS The bumper reflectors make the BMW M2 instantly recognizable from behind, especially at night.



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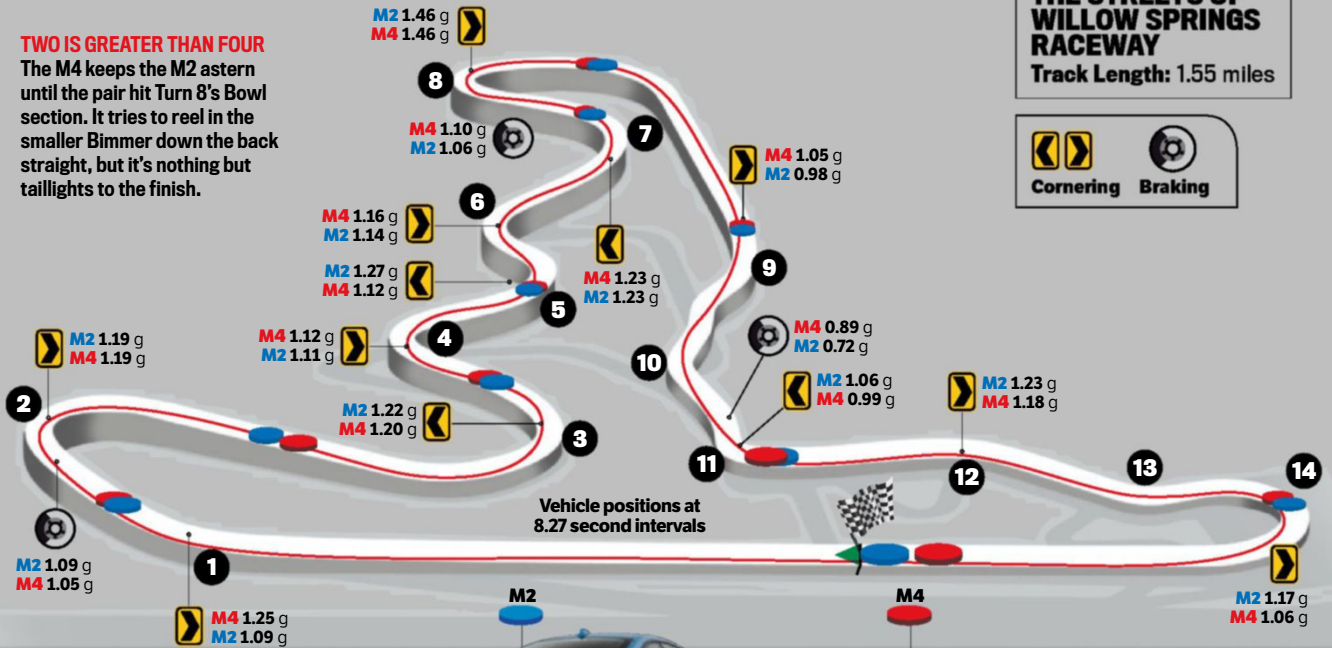
HEAD TO HEAD | BMW M4 VS. BMW M2

TWO IS GREATER THAN FOUR

The M4 keeps the M2 astern until the pair hit Turn 8's Bowl section. It tries to reel in the smaller Bimmer down the back straight, but it's nothing but taillights to the finish.

THE STREETS OF WILLOW SPRINGS RACEWAY

Track Length: 1.55 miles



BEST LAP TIMES

BMW M2

1:22.73

BMW M4

1:22.94

SPEEDS AROUND TRACK



M2 versus M4: Sibling Rivalry

We were surprised that the M2 posted effectively identical test numbers to the M4's despite a 60-hp deficit and tires 10mm narrower at each corner. The M4 pulls a significant lead in acceleration at higher speeds, where its

rear tires aren't overwhelmed by the thrust of its more powerful engine. Combining that with its longer wheelbase, we estimated the M4 would be much faster than the M2 around a racetrack. We were wrong. The M2 proved

to be the faster car. This is the difference that intangibles make. This M4, although far better than previous M4s we've driven, was a handful to control at its limit. With very little understeer and laggy turbos that hit with a brutal punch,



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it snap-oversteers on the way out of corners. The M2 understeers more but puts power down far more easily. Importantly, its engine and rear end respond linearly to the requests for power, making it far easier to control, even for a seasoned veteran like Randy Pobst. In his supremely talented hands, the M2 was 0.21 second quicker around Streets. In yours or mine, that difference would be far greater. **JC**



Direct from our imagination. **Introducing the all-new Civic.**



Civic Touring Sedan shown. ©2015 American Honda Motor Co., Inc.

Its steering feels directly connected to the front wheels, the effort builds lockstep with cornering loads, and it actually transmits road surface texture to the driver. Had BMW's electric assist started out this good, we wouldn't have complained nonstop for years.

Despite a wheelbase 4.7 inches shorter than the M4's, the M2's ride quality is just fine—indeed, it's somehow less choppy than the fixed-damper M4's. That said, the car is quite stiff, something that's a problem only for those who buy an M car because it's the most expensive model in the lineup and then complain that they've spilled their three-pump chai soy sugar-free nonfat mocha lattes when driving over rough pavement. To those folks, may we also recommend buying the automatic and then never speaking to us again. We're breaking up with you.

The manual, for what it's worth, has a shifter that's inexplicably more precise than the M4's we tested and has less rubbery gear engagement and no resistance to being rushed. Unfortunately, it comes with one massive flaw: automatic throttle blipping that can't be fully disabled unless you turn stability control completely off.

Stability control is the biggest single advance in automotive safety since the seat belt, and yet in order to drive your manual-transmission M2 like a manual-transmission M2, you have to fully disable it. For years, we've accused the German car industry of trying to kill the manual transmission; now we have evidence that it's trying to kill the very people who demand those transmissions. This brainless decision is akin to BMW saying, "You can have all 365 hp but only if you take off your seat belt." It shows BMW's fundamental misunderstanding of why someone would buy a \$52,695 compact coupe with rear drive and a stick.

There are but three options (\$550 for metallic paint; a \$1,250 Executive package that includes a backup camera, heated steering wheel, and a few small electronic goodies; and the \$2,900 automatic that's clearly there solely for ADA compliance.)

The seats are wonderfully supportive, though the driver's seat is not centered behind the steering wheel. With the driver seated inboard of the wheel, BMW angled the seat toward the left-front corner. It's a cheap trick that only perfectionists would notice. BMW should be catering to perfectionists.

But the perfectionist behind this keyboard could not find a single fault with the M2's on-track performance. We lapped a DCT Euro-spec M2 (with BMW accessory brake pads that aren't available in the U.S.) at Mazda Raceway Laguna Seca and then our test car at Streets of Willow. In both cases, the speeds were high, they came easy, and my grin was unrelenting. When lapped at a playful pace with lots of room for silliness, the M2 is happy to join in the fun with on-call oversteer on the way into or out of a corner. At full assault, this is a modern BMW that doesn't

put a foot wrong. The Michelins break away smoothly and slowly and howl just enough to make up for what the electrically assisted steering lacks for feedback at the limit.

The M2's front end is incredibly accurate, and the rear remains totally planted. There's some understeer, but applications of the throttle call upon that rear diff and gradually tuck in the nose. The M2 exhibits progressive throttle-steerability that we've never seen on a turbocharged BMW. Power comes on smoothly, no doubt aided by its single, twin-scroll turbo. Or maybe it just doesn't have too much power, like the M4, which is constantly overwhelmed by its own thrust.

The brakes were indefatigable, but we could swear that after five laps, the M2's midrange power dropped off. Because the baby M car has no temperature gauges, we're left to assume the engine's temperature had risen to the point that overboost was no longer available. The lack of a gauge is unacceptable in an M car. You can call up a digital coolant-temperature indicator in the LCD screen below the gauges, but it never moves off "OK" until, presumably, the engine has melted itself into a puddle of molten aluminum. The auto throttle blip is likewise inexcusable. And the substitution of the regular BMW drive modes rather than the typical M car's ability to control throttle, steering, and chassis settings separately is almost as upsetting. As is the lack of M memory buttons on the steering wheel, which are present in other M cars. You can likely blame cost-cutting for all those flubs—and without all that M-specific stuff, you could argue that the M2 should, like its predecessor, wear a non-M badge. Calling it the 2 Series M Coupe might be better. Or just the M240i.

Name notwithstanding, the M2 represents an unexpected return to form. Sure, it inherits some of the regular 2 Series' warts, but it's proof that while BMW treads off in the wrong direction, someone over at M is paying attention. With the M2, BMW has made an interactive, enjoyable machine, something we didn't think possible. And that gives us hope. ■

2016 BMW M2 (European Spec)

BASE PRICE	\$52,695*
PRICE AS TESTED	N/A
VEHICLE LAYOUT	Front-engine, RWD, 4-pass, 2-door coupe
ENGINE	3.0L/365-hp/343-lb-ft turbocharged DOHC 24-valve I-6
TRANSMISSION	6-speed manual
CURB WEIGHT (F/R DIST)	3,411 lb (52/48%)
WHEELBASE	106.0 in
L X W X H	176.2 x 73.0 x 55.5 in
0-60 MPH	4.2 sec
QUARTER MILE	12.8 sec @ 107.5 mph
BRAKING, 60-0 MPH	107 ft
LATERAL ACCELERATION	1.01 g (avg)
MT FIGURE EIGHT	24.1 sec @ 0.82 g (avg)
EPA CITY/HWY/COMB FUEL ECON	18/26/21 mpg
ENERGY CONS, CITY/HWY	187/130 kW-hrs/100 miles
CO2 EMISSIONS, COMB	0.93 lb/mile

*U.S. model



LOOK CLOSE You'll see a few things unavailable on U.S.-spec M2s, such as the semi-automatic climate control, non-Navigation iDrive, and manual seats. Also not available: Swiss intern named Guy.



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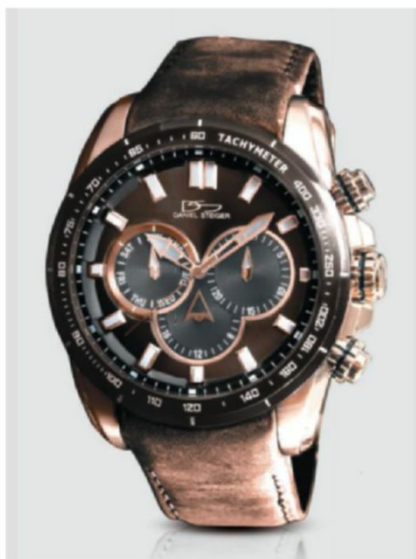
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E21 Neutered by '70s U.S. emissions rules.

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2002 The Turbo model was even more heroic.



The Dreaded Second-Time Flub Looking back on BMW hits and misses



So often, it seems, the Germans stumble onto automotive greatness. They produce a special car outside of the normal product-planning cycle, and it becomes an instant legend. Then the marketers try to replicate that magic for the next generation but show a fundamental misunderstanding of what made the original great in the first place. No German car company is immune: Porsche 928 replacing the 911? Ha. VW R32 Mk5 replacing the Mk4? Sorry, folks. The Audi Allroad replacing the A4 Avant? Not even close. The Mercedes W113 SL replacing the W198 300SL? Hardly.

There are more examples, but BMW seems to be the worst offender. When we heard about the 1 Series M Coupe replacement, we worried. Luckily, the M2 bucked the trend, but BMW has a history of replacing brilliance with bombs.

From 2002 to E21

The 2002 was an aberration, created by some rogue engineers and pushed into production by Max Hoffman, the U.S. importer. Putting the big sedan's 2.0-liter engine into the little two-door '02 "accidentally" created the modern German sport sedan. The E21 320i that replaced it was a dud. It took BMW a decade to regain that mojo with the 1987 325is.

From E30 M3 to E36 M3 (U.S.)

The E30 M3 wasn't in any marketing plan. It was a homologation car built solely so BMW could go kick Mercedes' butt in the DTM racing series. BMW wasn't convinced it could sell the 5,000 requisite production cars, but it wound up selling almost 18,000 worldwide. In the U.S., it was replaced by an M3 with no racing heritage and no race engine—just a larger version of the 325i six-cylinder. It sold in big numbers, but if you look at what E36 M3s are worth today relative to other M3s, it's obvious the market knows what's what. That replacement, the E46 M3, finally got another real M engine for the U.S. market. It sold like the dickens then and is still worth good money now.

From E28 M5 to E34 M5

The E28 M5 was a hand-built monster that papered bedroom walls the world over. Using the motorsport-bred 24-valve twin-cam six from the M1 supercar, the 1988-only M5 was a true wolf in sheep's



E36 Great chassis, meh motor.

clothing and the fastest sedan in the world. It wasn't replaced until 1991. In the intervening years, the 5 Series became bigger and much heavier, and the E34 M5 broke no new ground except to barely match the original's performance. It wasn't a bad car, but it missed the drama of the original, which wasn't matched until the following-generation E39 M5 in 2000. And don't get us started on the disastrous E60 M5 that replaced it.

From Z1 to Z8 with Z3 and Z4 in the middle

The Z1 was never sold in the U.S. but was an experimental car shown to an awestruck public in 1987. The E30/Z-chassis Z1 used the M20



E28 The OG murdered-out Bimmer.

straight-six from the E30 325i, mounted front-midships behind the axle line. Its steel chassis was covered by thermoplastic dent-proof body panels, and its doors dropped into the side sills. The rear suspension was BMW's Z-Axle, a newly developed multilink setup that found its way into the E36 3 Series. Yet its replacement, the beautifully styled E36/7 Z3, carried no innovations. In fact, it took a step back with a genuinely craptastic interior and E30-style semi-trailing arms in back. It was replaced by two generations of Z4s, the first E85-chassis Z4 that was just plain ugly and the current E89-chassis retractable hardtop one, which is selling so poorly you probably forgot it exists. The only Z-car to capture the original's magic was the spectacular E52 Z8. And BMW hasn't even tried to replace that masterpiece. **JC**



M-FIVE-HUNDRED This M5 was almost 500 pounds heavier than the model it replaced, and it used the same basic engine.



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The engineers in charge of the 2017 Hyundai Elantra must have spent some time with the team that puts together the Genesis because the ride is good. Really good, especially for a small Hyundai. During a scenic tour of L.A., our Elantra test car handled everything Google Maps threw at it with the composure of a larger, more expensive sedan. Rebound was excellent over larger bumps, and even the harsh impacts were dulled before they reached the driver's seat. Steering feel varies subtly between Normal and Eco,

but Sport mode ramps up the effort at low speeds. There isn't much road feedback, but that's to be expected from this segment.

Performance is on par with other compacts, faster than a Toyota Corolla but slower than the 2016 Honda Civic we've tested. Running the 2017 Hyundai Elantra Limited around our figure eight confirmed our seat-of-the-pants impressions; the controlled chassis, although no Focus ST, is a solid handler. The 2017 Elantra was slower in a straight line but a half-second faster around the figure eight (27.2 seconds at 0.62 g) than a



NO TURBO But one is coming in the Eco.



COMPACT CAR? That depends on who you ask. The 2017 Hyundai Elantra's 110.2 cubic feet of interior volume make it a midsize car in the EPA's book.

Words Austin Lott Photographs Robert Guio

QUALITY TIME WITH BIG BRO GENESIS
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ALL GROWN UP



Our Elantra handled everything with the composure of a larger, more expensive sedan.

FIRST TEST

2014 Elantra GT. Apples-to-apples, the Elantra has improved in every metric, too.

We preferred the Normal drive mode most of the time, as we found throttle response in Sport almost too touchy for creeping along in traffic. The Elantra's 2.0-liter I-4, which makes 147 hp and 132 lb-ft of torque, is enough for going from A to B, but it won't get you drunk on power. The EPA estimates 28/37 mpg city/highway, but *Motor Trend's* Real MPG numbers suggest slightly better. The Elantra's 28.8/40.5/33.1 mpg city/highway/combined puts it below only the 2014 Toyota Corolla LE Eco (30.8/39.4/34.2 mpg) and tied with the 2016 Honda Civic Touring turbo (27.1/45.3/33.1 mpg). Not only is the Elantra with a six-speed automatic more enjoyable to drive than the CVTs present in the segment, but you'll also see better real-world fuel economy than in most of the competition.

Our Elantra Limited carried a base MSRP of \$23,185 but rang in at \$27,710 with the \$2,500 Tech package, \$1,900 Ultimate package, and \$125 carpeted floor mats (they're nice). The interior has thoughtfully placed touches throughout, such as knee-level padding for



2017 Hyundai Elantra Limited

BASE PRICE	\$23,185
PRICE AS TESTED	\$27,710
VEHICLE LAYOUT	Front-engine, FWD, 5-pass, 4-door sedan
ENGINE	2.0L/147-hp/132-lb-ft Atkinson-cycle DOHC 16-valve I-4
TRANSMISSION	6-speed automatic
CURB WEIGHT (F/R DIST)	2,942 lb (61/39%)
WHEELBASE	106.3 in
L X W X H	179.9 x 70.9 x 56.5 in
0-60 MPH	9.0 sec
QUARTER MILE	16.8 sec @ 84.7 mph
BRAKING, 60-0 MPH	116 ft
LATERAL ACCELERATION	0.83 g (avg)
MT FIGURE EIGHT	27.2 sec @ 0.62 g (avg)
EPA CITY/HWY/COMB FUEL ECON	28/37/32 mpg
ENERGY CONS, CITY/HWY	120/91 kW-hrs/100 miles
CO2 EMISSIONS, COMB	0.62 lb/mile

the center console and the main touch-points on the door panels. The Tech package includes heated outboard rear seats and a memory system for the driver's seating position. We like the hands-free smart trunk. No limb waving—just walk up to the locked car, key fob in your pocket, stand behind it, and after a few beeps the trunk pops open just enough to let you nudge it fully open with your hands full. Remember, though, that it will begin the opening sequence even if you're just stopping for a chat behind the car.

For 2017 Hyundai gave the Elantra a host of safety features that just a few years ago would have been generous on a top-spec S-Class: lane departure assistance and warning, forward collision warning with auto braking, blind-spot warning with rear cross traffic alert, and Smart Cruise Control. Everything works really well for an automaker's entry-level offering. The Elantra should earn top ratings from the IIHS and NHTSA in crash testing; the 2015 Elantra earned a Top Safety Pick rating from the IIHS, and the 2016 earned five stars in NHTSA testing. The Elantra also features Android Auto and Apple CarPlay compatibility, which are becoming more widely available in the compact sedan segment. Both systems make interacting with messaging, phone calls, navigation, and music easy by offering robust speech recognition and simple yet intuitive user interfaces.

The 2017 Hyundai Elantra is more refined, more efficient, and a little less expensive than the car it replaces. At first glance we were shocked that an Elantra would sticker for nearly \$28,000, but once we spent some time in it, we banished memories of the Hyundai we knew from the mid-'90s. Besides, comparable compacts go for about the same money. If you're in the market for a small sedan with a midsize interior and you want more than basic transportation, put the Hyundai Elantra on your short list. ■



COOL, YES. Bear-proof? Probably not.

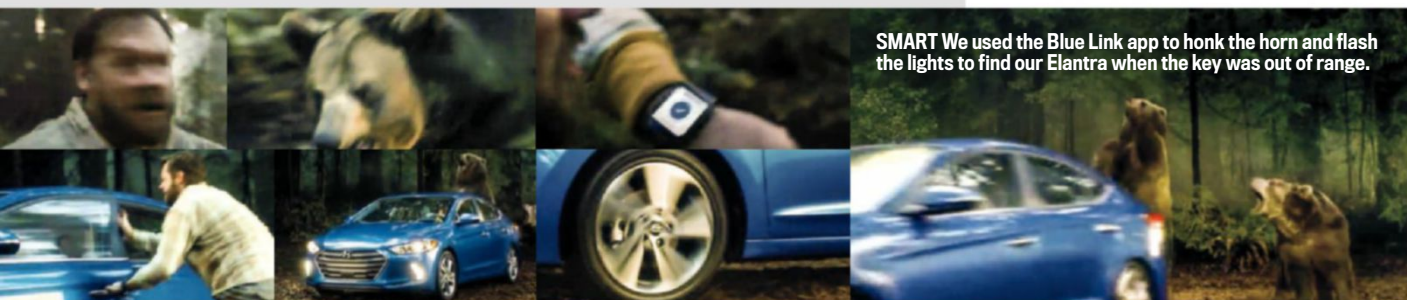
Remember the Hyundai Super Bowl ad that featured the 2017 Elantra, a bear, a smartwatch, and a narrow escape? We investigated and came to the conclusion that while Hyundai's Blue Link system can do all kinds of cool things, it most likely can't save you from an angry bear. If the ad's premise really happened—a guy and a girl are running frantically away from a bear toward their Elantra, which they start via smartphone—you'd be smarter to skip the tech, use the standard keyless

entry, and get out of there.

How do Blue Link's telematics work? Your smartwatch (Android Wear or Apple Watch) gets linked to your smartphone, which is able to send commands to the vehicle via the cellular connection built into the system (Hyundai's version of OnStar). You select the app on your watch, issue the command (via voice or pressing a button), enter a PIN, and wait 20-40 seconds for the car to unlock or lock the doors, start or stop the engine, flash

the lights, or honk the horn.

The backend steps make the process a little cumbersome (send command to the cloud, cloud initiates connection with Hyundai Elantra, Elantra receives command, Elantra mulls it over, Elantra's engine starts), but simpler commands are processed most quickly. We saw door lock/unlock commands go through in 15-20 seconds, but the engine start took nearly 45 seconds. So if you use the tech, make sure to allow time to escape a bear. **AL**



SMART We used the Blue Link app to honk the horn and flash the lights to find our Elantra when the key was out of range.



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At the launch of the 2017 XT5, Cadillac boss Johan de Nysschen wasted little time in announcing that GM's New York-based luxury

brand is working on 11 new products, not including the recently introduced CT6 sedan and this XT5. With gas on the cheap and SUV sales on the rise, you can bet most of those 11 will bear XT badges. (XT stands for "Crossover Touring.") Audi, BMW, and Mercedes-Benz already boast diverse CUV lineups—BMW alone has five crossover nameplates—so the idea of Cadillac expanding with an XT4, XT6 "coupe," and a three-row XT7 is about as far-fetched as edamame spaghetti. (Feel free to try it, but it's not that tasty.)

F O R E S H



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CROSSOVERS
TO COME**

Words Ron Kiino

A D O W E R

Per de Nysschen, the cost-saving secret ingredient is the XT5's all-new architecture, which has the means to underpin multiple crossovers. "It's modular, allowing for several vehicles off of one investment," he said. "It can be stretched, widened, with different powertrains and suspension modules." Of course, other GM vehicles will get in on this architecture. Think next-gen Chevrolet Traverse and Buick Enclave as well as the GMC Acadia, which will roll out of GM's Spring Hill, Tennessee, assembly plant (yes, where Saturns were once built) alongside the XT5.

Being the first to hit the market, not to mention the one replacing last year's best-selling Cadillac (see sidebar), the XT5 needs to make a powerful and lasting first impression. We're not sure its evolved Art and Science design language makes a bold enough statement or that it really separates itself from the

similarly styled SRX, but the new 3.6-liter V-6 (the one that debuted in the fall in the ATS and CTS) under the hood has the stout stats to leave a mark: 310 horsepower, 271 lb-ft of torque, and EPA numbers of 19/27/22 mpg city/highway/combined (FWD) and 18/26/21 (AWD). A 2.0-liter turbo-four will be offered in XT5s sold in China, but we're more likely to see that motor in something such as an XT4. Shift duties fall to an Aisin eight-speed automatic that engages via an Electronic Precision Shift or a shift-by-wire gear lever. It's similar in function and appearance to what BMW uses, and according to Cadillac, it improves NVH and frees up valuable real estate below the console for purses, documents, and tablets. (There's a power outlet down there, too.) The eight-speed routes power to the front wheels or via an available compact, lightweight twin-clutch all-wheel-drive system to all four. The system features a clutch for each rear wheel that can send nearly all available torque to either rear wheel if the other three lose traction. It offers three driver-selectable modes.

On the highways and roads in southern Orange County and eastern San Diego, the XT5 proved itself, first and foremost, to be quiet. Like, really quiet. Wind and road noise have been thwarted to whisper levels, and the V-6, which uses cylinder deactivation that seamlessly switches between V-4 and V-6 modes, is as serene as they come; it's refined and gutsy, too. Much of this impressive

quietness comes from the lighter, stronger structure that touts extensive use of high-strength steels and structural adhesives. "Efficient performance, better NVH, and more agility through mass reduction and technology," XT5 chief engineer Paul Spadafora said. Whereas the SRX could feel cumbersome, the XT5, nearly 300 pounds lighter, comes across as lithe and athletic in comparison. The electric power steering serves up clear communication, the front strut/rear multilink suspension delivers confidence-inspiring dynamics, and the 20-inch wheel/tire combo, which bundles ZF's CDC4 continuous damping system, provides comfort without sacrificing sportiness. Despite dimensions that have actually shrunk a smidge, the XT5's wheelbase is up 2.0 inches and its rear track stretched 1.0 inch, improving ride and dynamics and adding 3.2 inches of rear legroom.

Speaking of which, legroom is commendable in both the front and second rows, though for 6-footers in the latter, it's best to recline the seat back for optimal noggin clearance.

Inside, the XT5 delights with premium leather and real wood, aluminum, and carbon-fiber trim. No faux stuff here. The dash and doors are covered in stitched materials,



As the first to hit the market, the XT5 needs to make a powerful and lasting first impression.



18 WHEELER Those sidewalls look big? Our XT5 photo vehicle featured base 18-inch alloys wearing 235/65 tires; Luxury and Premium Luxury trims get 20s with 235/55 Michelins.



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*The 2017 Nissan GT-R is not yet available for purchase. Expected availability June 2016. Obey all traffic laws, always drive safely and wear your seat belt. Damage resulting from racing, competitive driving, track and/or airstrip use not covered by warranty. See your New Vehicle Limited Warranty and Owner's Manual for proper vehicle operation and complete warranty details. ©2016 Nissan North America, Inc. Nissan and GT-R logo are Nissan trademarks.



RISE XT5's liftgate features hands-free operation via foot gestures below the rear bumper.



2017 Cadillac XT5

BASE PRICE	\$39,990
VEHICLE LAYOUT	Front-engine, FWD/AWD, 5-pass, 4-door SUV
ENGINE	3.6L/310-hp/271-lb-ft DOHC 24-valve V-6*
TRANSMISSION	8-speed automatic
CURB WEIGHT	4,000-4,350 lb (mfr)
WHEELBASE	112.5 in
L X W X H	189.5 x 75.0 x 66.0 in
0-60 MPH	6.5 sec (MT est)
EPA CITY/HWY/COMB FUEL ECON	18-19/26-27/21-22 mpg
ENERGY CONSUMPTION, CITY/HWY	177-187/125-130 kW-hrs/100 miles
CO2 EMISSIONS, COMB	0.88-0.93 lb/mile
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So long, sales champ

Remember when the 2010 SRX debuted? We don't blame you—we've nearly wiped it from our memories, too. But at the time Cadillac's new midsize CUV, developed with Saab (Did you also forget the 9-4x?), ushered in a new era for Caddy crossovers, offering a 300-h 2.8-liter, turbocharged V-6; 20-inch wheels; and a fresh take on the Art and Science design theme. Sales were 20,327 in its first limited production year on sale, but averaged 55,168 from 2010-'14 and topped out at 68,850 in its seventh and final year. Not bad. For context, you know all of those Escalades you see out there? Cadillac moved 35,921 of those last year, just over half that of the SRX. Now that you know, start looking out for the SRX. Despite an under-the-radar image, it prompts a whole lot of blips. **Ron Kiino**



STRONG FINISH Nearly 70K sold in final year.



CHOICES The XT5 offers five interior color and trim choices, the latter including carbon fiber, two varieties of aluminum, and four types of real wood.

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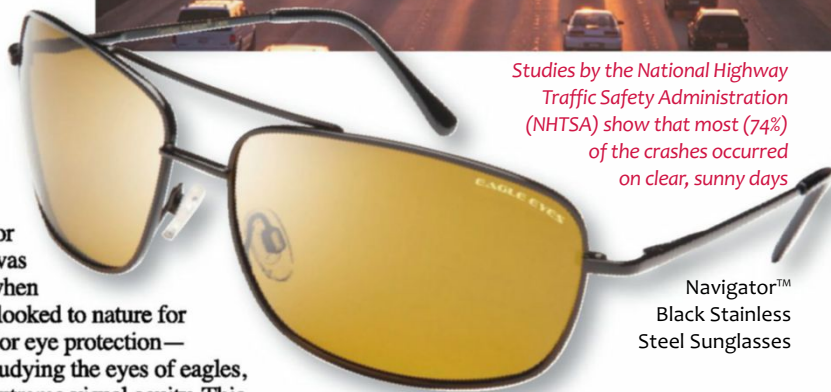
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AREA



SOLDIERS OF FORTUNE
All three of these slab-sided beasts have seen military service during their life cycles.

WYPER

SOON

COMPARISON | Jeep Wrangler Unlimited Rubicon Hard Rock VS. Mercedes-Benz G550 VS. Toyota Land Cruiser

STICK-AXLE SNOWBOUND SAFARI
WE TAKE THESE LAST-OF-A-KIND SUVs
TO THE END OF THE WORLD AND BACK



Words Christian Seabaugh **Photographs** William Walker



We seem to be obsessed with the end of society. Whether it's zombies or the Soviets or our collective desire to make America great again, we probably spend more time dreaming about the end than any modern civilization. Maybe it's because of our can-do attitude and self-reliant nature or because we see the world as a temporary place, but Americans are preppers, collectively planning for the apocalypse. And automotive journalists are not immune to those thoughts.

When discussing the end in our office, our minds more often than not wind up on what

vehicle we'd want during an unspeakable disaster. When the world ends, no matter the cause, you're going to have to be able to drive your bugout vehicle on one of our almost 47,000 miles of interstate highway. You'll also have to be ready for inclement weather. And finally, you'll need a vehicle that can take you and your family off-road and into safety. Toss out cost (you're not getting these from a dealer when the gates of hell open) and luxury (isn't life the largest luxury of all?). The winner of this comparo will be the end-of-the-world-ready off-roader best suited for apocalyptic calamities.

COMPARISON

DROP TOP The Jeep Wrangler's soft top (or optional hard top) is perfect for enjoying a sunny day. Or for mounting a .50-caliber machine gun.

The three SUVs that come up in our discussions most often form the basis for our steal-it-if-the-world-ends comparison test: the Jeep Wrangler, the Mercedes-Benz G-Class, and the Toyota Land Cruiser.

They have far more in common than you'd think.

In addition to having bodies on frames, transfer cases, locking differentials, and live axles, all three have military origins, one even serving the mighty United States Marine Corps to this day. Their martial beginnings promise the capability to quickly and reliably go anywhere, on- or off-road, no matter the conditions.

Of our three, the 2016 Wrangler Unlimited Rubicon Hard Rock most lives up to the spirit of its ancestors, right down to the cloth top (a fallout-resistant hardtop is an option) and Dana axles. The Jeep is powered by a tried and true 3.6-liter Pentastar V-6 making 285 hp and 260 lb-ft of torque mated to an optional five-speed automatic transmission. Go-anywhere goodies include a manually shifted heavy-duty Rock-Trac two-speed transfer case, Dana 44 axles, and electronically locking differentials at either end. The Jeep is also fitted with an electronic anti-roll





bar disconnect for extra off-road articulation. For good measure, the Rubicon Hard Rock package adds extra body armor in the form of steel front (with detachable end caps) and rear bumpers and Mopar rock rails.

Our modern-day 200 series 2016 Land Cruiser would be hardly recognizable to its creators. It's got a refrigerator and room for eight—the original didn't even have a roof or doors. The Land Cruiser is powered by a 5.7-liter V-8 making 381 hp and 401 lb-ft of torque mated to a new-for-2016 eight-speed automatic. The Toyota sports a full-time four-wheel-drive system with a default 40/60 front/rear split and a Torsen limited-slip locking center differential sending torque to the axle with more grip. The Land Cruiser is the only rig here with an independent front suspension (don't panic—it's got a traditional

solid rear axle out back), but it makes up for it with a hydraulically actuated suspension system that automatically adjusts the stabilizer bars' lean resistance to minimize wheel lift off-road and maximize traction on-road.

Low range activates a whole new set of off-road tools for the Land Cruiser, including Multi-Terrain Select, designed to help the Toyota perform better in mud, rocks, or sand; Crawl Control, which helps manage speed as the hefty Land Cruiser climbs up and down steep obstacles; and Off-Road Turn Assist, which helps mitigate the Toyota's length on narrow trails by locking the inside rear tire while turning, allowing the truck to pivot on said tire almost like a tank.

Although the basic Geländewagen (German for "cross-country vehicle") formula hasn't changed in 37 years, it has advanced with the times. The anemic four- and five-cylinder diesel engines the G launched with have long since disappeared. In their place in the U.S. lineup sit a pair of V-8s and a V-12. As tempted as we were to bring a 621-hp V-12 Mercedes-AMG G65 along for the end of the world, the updated 2016 Mercedes-Benz G550 is a more sensible choice. Under its hood is a new 4.0-liter, twin-turbo V-8 making a

healthy 416 hp and 450 lb-ft of torque paired with a seven-speed automatic and a full-time four-wheel-drive system. Like the Jeep, the G550's off-road hardware is pretty simple: an electronically switchable low range and locking center, front, and rear differentials. The G-wagen gets bonus cool points for current military duty, serving the U.S. Marine Corps as the Interim Fast Attack Vehicle.

Freeway to Freedom

More than half of Americans live on the earthquake- and tsunami-prone West and hurricane-prone East Coasts. It isn't too hard to imagine a scenario where coastal Americans would have to escape some sort of water disaster to higher ground. And those major population centers? Obvious targets for evildoers or breeding grounds for a plague. Odds are if you're one of those 159.5 million, you're going to spend a bit of time on the interstate escaping inland. To simulate such a situation, Scott Evans, Jonny Lieberman, and I packed up the Jeep, Toyota, and Mercedes-Benz and pointed



RIDERS ON THE STORM

All three rigs have underbody skidplates, but extra body armor is important; the Wrangler Rubicon Hard Rock has steel bumpers and steel rock rails, and the G550 sports a standard brush guard. The Land Cruiser makes do without.



Of our three, the Jeep most lives up to the spirit of its military ancestors.



KINGS OF THE HILL If you really need to escape, these three will take you farther off trail than almost any other vehicle.

our rigs northeast toward northwestern Colorado—7,000 feet has got to be high enough to escape a big wave, right? The miles to the mountains would allow us to determine which vehicle would best bug out while balancing performance, fuel economy, and comfort on the open road.

For escaping in a hurry, it's tough to beat the G550. The flying brick will do 0-60 in 5.9 seconds and complete the quarter mile in 14.4 seconds at 95.7 mph. Flat-footing the throttle at highway speeds spurs on quick downshifts, the twin-turbos ensuring an absolute wall of torque that'll help the G out-accelerate almost anything on its tail, even at altitude. You pay for that performance, though; the G550 nets a Real MPG score of 17.0/15.3/16.2 mpg city/highway/combined.

Down two turbos, two cylinders, and two cogs to the Benz, the Rubicon accelerates from 0 to 60 mph in 8.2 seconds and needs 16.3 seconds to finish the quarter mile at 82.5 mph. The V-6 and five-speed automatic combo are fine in L.A. but lack the oomph of the Jeep's torquier rivals, especially at high

elevations. Passing becomes an exercise in planning ahead and patience—not ideal if you're making a break for it. (You don't have to be the fastest; you just can't be the slowest.) The Jeep's 14.4/17.1/15.5 Real MPG isn't the stuff of long-term survival, either, so plan on scavenging a jerrycan or two.

The Land Cruiser nicely splits the difference. The Toyota takes 6.8 seconds to accelerate from 0 to 60 and 15.2 seconds to complete the quarter mile at 91.2 mph. The Land Cruiser's ride is soft, and the cabin is quiet. There is room for improvement, though; the brakes are too touchy, and in the default drive mode, the transmission is annoyingly eager to upshift in an effort to save fuel. That could be for the best, though. Thanks to the Land Cruiser's 12.3/19.2/14.7 Real MPG rating and relatively small 24.6-gallon fuel tank, we found it difficult

to get much farther than 300 miles between fill-ups on our highway drive to Colorado. It's worth mentioning that Australian-spec Land Cruisers come standard with an 11.9-gallon auxiliary tank—that's definitely something worth looking into before the end.

Winter Is Coming

We needed to find some powder. That turned out to be as simple as calling the Bridgestone Winter Driving School in Steamboat Springs, Colorado. The Bridgestone school is where pro rally driver Tanner Foust honed his chops and where we spent a day honing ours before letting the Land Cruiser, Wrangler, and G550 loose in the snow. The Bridgestone School supplied a set of Blizzak winter tires for both the Jeep and Toyota. Mercedes recently upped the wheel size for the G550, and there are currently no winter tires that fit it. The best way to figure out which vehicle ruled in the snow would be back-to-back-to-back hot laps to simulate an escape with our lives and our gear, imaginary War Boys in pursuit. (We brought machetes; it seemed like a good idea at the time. See page 34 for blade recommendations.) We agreed that the vehicle that gripped the best, got stuck the least, and felt the most sure-footed deserved the King in the North crown.

We probably should've realized it before twice yanking it out of a snowbank, but the Mercedes was at a huge tire disadvantage. With the powder still soft, the G550's stock



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MAY 19-21 TC, GT, GTS - LIVE
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MAY 27-28 GT, GTS - LIVE
LIME ROCK PARK,
LIME ROCK, CT

JUN 23-26 TC, GT, GTS - LIVE
ROAD AMERICA,
ELKHART LAKE, WI

JUL 29-30 TC, GT, GTS - LIVE
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CAR COURSE,
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Fun Times at the Bridgestone Winter Driving School

I'm a New Yorker, so I like to think I'm pretty good at driving in the snow. I spent my college years learning hard lessons on car control by driving a Mustang GT with all-season tires through western New York's brutal lake-effect snow. But I've been living in Los Angeles for nearly five years now, and I'm undoubtedly rusty. Since the search for safety at the end of the world already put me in Colorado, I called up the Bridgestone Winter Driving

School in Steamboat Springs to spend a day honing my chops.

Founded 33 years ago, the Bridgestone Winter Driving School is designed to teach everyone from new drivers (there were two 16-year-old girls in my class; props to their parents) to military and law enforcement personnel the car control techniques necessary to safely and efficiently drive in the snow. The school, which partners with Lexus, uses a fleet of Lexus ES350s and NX200ts modified with defeatable anti-lock braking and traction control systems and fitted with Bridgestone Blizzak winter tires.

My day at the Bridgestone School started as most driving schools do: in a classroom. After our instructor walked us through the syllabus, we watched a video, had a short question-and-answer

session, and then piled into a shuttle to Bridgestone's track.

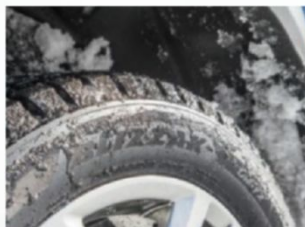
Once at the track, we spent the morning doing laps, practicing panic stopping in the snow, and inducing over- and understeer while we lapped a hillside skidpad. The oversteer and understeer exercise was my favorite, for obvious reasons. After a quick lunch break, we picked things up with accident-avoidance exercises that forced the driver into a Scandinavian flick. The exercise really drove home that avoiding everyday hazards while

in a low-grip environment such as snow or ice requires a totally different understanding of how your vehicle performs. Friction and inertia, two important concepts the average American driver doesn't remember from physics class, really come into play.

One of my favorite things about driving in the snow back in college was being able to effectively practice car control in a low-risk, low-speed, low-grip environment. The Bridgestone Winter Driving School nails re-creating that experience, but it's also backed by some serious educational knowledge that'll take most drivers years of experience to learn on their own.

The Bridgestone Winter Driving School opens for next season on December 17, 2016. More info can be found at Winterdrive.com.

Christian Seabaugh



The Bridgestone Winter Driving School teaches everyone from new drivers to military and law enforcement personnel.

SNOWPLOW Ever wonder what understeer looks like? The top photo is a textbook example of it.



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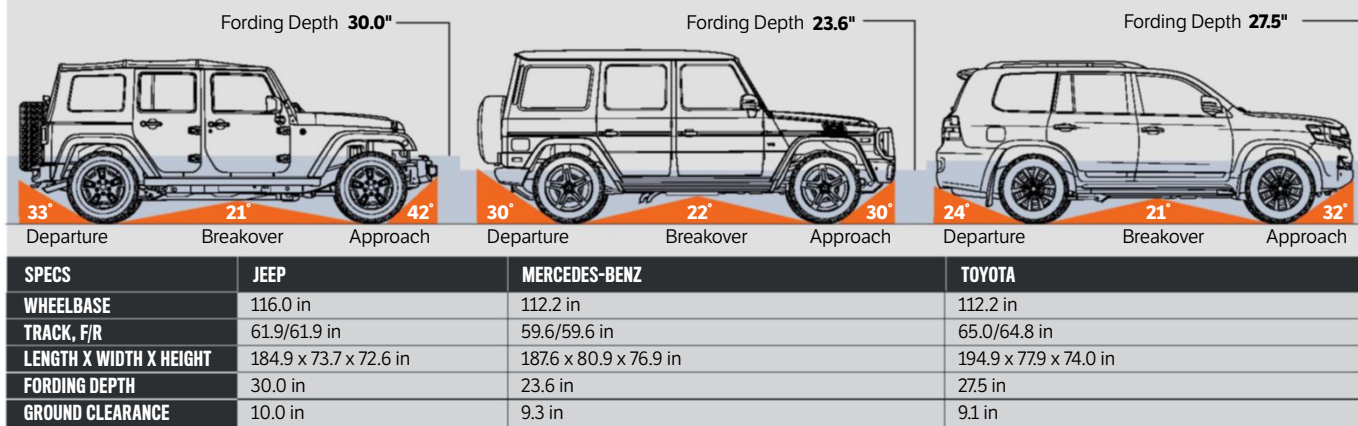
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COMPARISON



There'd really only be one escape off-road: Moab, Utah, where the pavement ends.



Illustrations: Paul Laguerre

M+S-rated Pirelli Scorpion Zero tires got it going well enough, but once that snow started turning into slush and ice, all bets were off. "It's hard to separate the G's snow performance from its tire handicap, but my gut tells me it would still be the loosest vehicle on winter tires," Evans said. "The high center of gravity and short wheelbase are an oversteer tag team, and while it is a ton of fun to drive sideways through the snow, that's not what you need at the end of the world."

Compared to the G-wagen, the Jeep might as well have been on tank tracks. With so much less weight to shuffle around and power being sent to all four Blizzaks, we actually had to really work at it to get the Jeep loose. You can prod the Jeep into doing some glorious Scandinavian flicks as you try to lose whatever's on your tail, but doing so requires high speeds, where some other Wrangler limitations rear their head. "All the SUVs were laying down some pretty big tracks in the

snow, and when the Jeep got sideways and crossed them, it felt like it was going to shake apart," Lieberman said. "Can we blame that on the front live axle? Partially. But the G also has a live axle up front, and it felt solid."

The Land Cruiser was practically a sports car in the powder compared to the other two. The Toyota effortlessly gripped the ice- and slush-covered track, and it was the only vehicle of the three to avoid getting dumped into a snowbank—and it's the vehicle that dragged the other two out. "It took a little bit of manhandling and Swedish flicking to make the Land Bruiser break free," Lieberman said, "but once it did, we were all carving perfect Tanner Foust-style drifts."

Moab Madness

An '80s FEMA map I stumbled across detailed the Soviet Union's likely nuclear first strike targets and confirmed that there'd really only be one escape off-road: Moab, Utah, where we'd test capability where the pavement ends.



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Big SUVs, Bigger Money

When the Bentley Bentayga arrived at dealerships in May, its base price was \$229,100. In justifying a house-priced SUV, Bentley CEO Wolfgang Dürheimer famously said, "At present if you want to buy a really expensive SUV, you can't." Not so fast, Wolfie. The as-tested price of this brown Mercedes-AMG G65 is \$222K, an option or two away from the big Bentley. There's also the Icon FJ44, which costs, well: "How much does the G-wagen cost?" Icon head honcho Jonathan Ward asked. "OK, that's what ours costs, too."

Before we answer the obvious yet plebian question—are these two worth the money?—let's

discuss what you get for all that scilla. In the case of the AMG, you get Mercedes' tried and true Geländewagen. The body-on-frame beastie has been stuffed with AMG's hand-built M279 6.0-liter, twin-turbo V-12 that makes 621 hp and 738 lb-ft of torque.

The FJ44 started life as a 1973 Toyota Land Cruiser and has since been completely reimagined by Icon. The only parts that remain are the hood and the chassis plate. The rest of the body is powder-coated aluminum. Noted hot rod frame builder Art Morrison constructed the custom frame. This FJ44—the Petersen Special, as it will be spending the next six months in the Petersen Automotive Museum—sports a 6.2-liter GM E-ROD LS3 V-8 fitted with a Magnuson supercharger. Power is estimated at 540 hp and 495 lb-ft.

In the sprint to 60 mph, the FJ44 needs 5.7 seconds. The quarter mile is over and done with in 14.4 seconds at 93.9 mph. Pretty good acceleration for a body-on-frame anything and a tick better than



FLYING HIGH The FJ gets the full Icon treatment, including an interior with aircraft-grade parts.

a CVT-equipped 2015 WRX (5.8 seconds to 60 mph, 14.5 seconds at 96.7 mph in the quarter). Braking in the non-ABS Icon is not so good: 146 feet from 60 mph. The V-12 G hits 60 mph in 5.2 seconds and runs down the quarter in 13.7 seconds at 103.7 mph. Braking from 60 mph happens in a decent 114 feet. We figure-eighted both vehicles and recommend that you don't. The AMG has undefeatable stability control that resulted in a poor lap of 30.5 seconds. For comparison, a Ford F-350 dually needs "only" 30.2 seconds to do the same. The Icon—which testing director Kim Reynolds described as "terrifying"—was a bit fleeter, needing 29.1 seconds.

Whatever deficits these two had on our handling course were immediately forgotten once we took them off-road. Yes, yes, we know. No one takes \$200K-plus SUVs off-road. Except us. These two are spectacular. Transfer cases and locking differentials (two ARB air lockers in the case of the Icon, three mechanical lockers for the G65) mean we could not find an obstacle these two couldn't handle. Trust me, we looked. Is either big-dollar SUV worth the money? As F. Scott Fitzgerald and we are fond of saying, the rich are different from you and me. If I were rich, the Icon FJ44 would be parked next to my G63, not G65. **Jonny Lieberman**



The G's intercoolers hang low. Not what you want while driving over dispatched foes.

After consulting with our local trail guide, Kevin Hawkins, we took our SUVs up Poison Spider, a narrow trail that heads up the slick rock of dry waterfalls.

Given that the Wrangler Rubicon was bred for conditions like this, it was our leader. "You don't have to off-road a Wrangler to know it'll crawl over anything," Evans said. If the Jeep couldn't make it up an obstacle, odds are the G550 and Toyota wouldn't, either. The Wrangler made everything look effortless; locking the diffs and letting the Rubicon Hard Rock scramble up steep rock

faces on its own cured any difficulty the Jeep encountered. "I knew the Jeep would get the job done," Evans said. "Places where the G and the Cruiser spun their tires or had to try a different line, the Jeep scrambled up like it was nothing."

The Mercedes looked out of place to most folks on the trail, but it's like a Marine in dress blues. They may look formal, but they're capable of anything. Even so, you'll want to take care—the G has tidy overhangs and respectable approach and departure angles, but its intercoolers are hanging

perilously low in the front bumper. Not what you want off-road—or while driving over dispatched foes. Low-mounted intercoolers be damned, the G-wagen was still impressive off-road. "The three locking diffs give you the confidence to drive over anything, as does the impressive range of axle articulation," Evans said, though he noted "dragging the silly downturned side-exit exhaust tips got annoying quickly and is guaranteed to attract zombies at the worst time."

While off-roading in the Land Cruiser, I repeatedly found myself saying it wasn't

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LOT 69034 shown 60728/62858/63054

Customer Rating ★★★★★

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COMPARISON

SECOND PLACE Jeep Wrangler Unlimited Rubicon Hard Rock

The little Jeep put up a valiant fight for first. With our two major complaints concerning the sluggish transmission and lack of power likely to be addressed when the next-gen Wrangler drops later this year, the Jeep will certainly be out for revenge.



THIRD PLACE Mercedes-Benz G550

The legendary G-wagen is a competent and capable off-roader we all adored. A little extra body armor and maybe one of the diesel engines offered in Europe might've been enough to shake things up a bit.



EXPERT LEVEL The Land Cruiser climbs a face that we had trouble walking up.

FIRST PLACE Toyota Land Cruiser

We were skeptical of its size at first, but the Toyota expertly manages to be as capable off-road as it is on the road. Armageddon may not be tomorrow, but we certainly wouldn't mind waiting it out in the Land Cruiser.



Any of these three vehicles is able to take you to and through the end of the world.

going to make it, yet time and time again it proved me wrong.

It wasn't that I thought Toyota couldn't make an off-roader; it's just its size and overhangs felt amplified on the trail. The Land Cruiser, however, comes with the tools it needs to hang with the little guys. "The Toyota won my heart," Lieberman said. "The big boy was able to go every single place that the other two were. Just activate Crawl Control and Turn Assist, and the Land Cruiser locks up the inside rear tire, allowing the Toyota to nearly pivot in place."

Only the Strong Survive

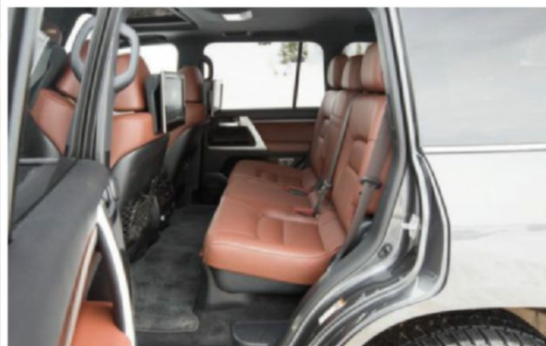
After escaping our contrived Armageddon, we could envision making it through the real thing in all three of these SUVs. Where it mattered, they were all evenly matched.





"Intellectually, I know we have to pick a winner, a second placer, and a loser," Lieberman said as we debated during the 1,000-mile drive back to civilization. "Emotionally, however, my heart is telling me that all three SUVs are equally lovable. I want to own all three."

Although the Mercedes G550 handled



everything, we agreed that its poor observed fuel economy, propensity to scrape expensive mechanical bits off-road, and white-knuckle handling characteristics both on the road and in the snow should put this endearing European in third. And as capable as the little Jeep Wrangler Unlimited Rubicon Hard Rock is on all difficult surfaces, its on-road manners really let it down. The Toyota Land Cruiser, though, does everything the Jeep and G do. It capably tackled Moab, and it offers the best blend of speed and bad-surface handling when you just have to get away. All three are able to take you to and through the end of the world, but it's the Land Cruiser we think would most likely survive Armageddon. ■



			
	2016 Jeep Wrangler Unlimited Rubicon Hard Rock	2016 Mercedes-Benz G550	2016 Toyota Land Cruiser
POWERTRAIN/CHASSIS			
DRIVETRAIN LAYOUT	Front-engine, 4WD	Front-engine, 4WD	Front-engine, 4WD
ENGINE TYPE	60-deg V-6, alum block/heads	Twin-turbo 90-deg V-8, alum block/heads	90-deg V-8, alum block/heads
VALVETRAIN	DOHC, 4 valves/cyl	DOHC, 4 valves/cyl	DOHC, 4 valves/cyl
DISPLACEMENT	220.0 cu in/3,604cc	243.0 cu in/3,982cc	345.6 cu in/5,663cc
COMPRESSION RATIO	10.2:1	10.5:1	10.2:1
POWER (SAE NET)	285 hp @ 6,400 rpm	416 hp @ 5,250 rpm	381 hp @ 5,600 rpm
TORQUE (SAE NET)	260 lb-ft @ 4,800 rpm	450 lb-ft @ 2,250 rpm	401 lb-ft @ 3,600 rpm
REDLINE	6,400 rpm	6,200 rpm	6,000 rpm
WEIGHT TO POWER	16.1 lb/hp	14.0 lb/hp	15.4 lb/hp
TRANSMISSION	5-speed automatic	7-speed automatic	8-speed automatic
AXLE/FINAL-DRIVE/LOW RATIO	3.73:1/3.10:1/4.00:1	4.38:1/3.20:1/2.16:1	3.31:1/2.22:1/2.62:1
SUSPENSION, FRONT; REAR	Live axle, coil springs, adj anti-roll bar; live axle, coil springs, anti-roll bar	Live axle, coil springs, anti-roll bar; live axle, coil springs	Control arms, coil springs, adj anti-roll bar; live axle, coil springs, adj anti-roll bar
STEERING RATIO	16.7:1	18.6:1	14.2-17.6:1
TURNS LOCK-TO-LOCK	3.5	3.3	2.7
BRAKES, F; R	11.9-in vented disc; 11.9-in disc, ABS	12.4-in vented disc; 10.7-in disc, ABS	13.9-in vented disc; 13.6-in vented disc, ABS
WHEELS	7.5 x 17-in, cast aluminum	7.5 x 19-in, cast aluminum	8.0 x 18-in, cast aluminum
TIRES	255/75R17 111/108Q M+S BFGoodrich Mud-Terrain T/A KM	275/55R19 111V M+S Pirelli Scorpion Zero	285/60R18 116V M+S Dunlop Grandtrek AT23
DIMENSIONS			
WHEELBASE	116.0 in	112.2 in	112.2 in
TRACK, F/R	61.9/61.9 in	59.6/59.6 in	65.0/64.8 in
LENGTH X WIDTH X HEIGHT	184.9 x 73.7 x 72.6 in	187.6 x 80.9 x 76.9 in	194.9 x 77.9 x 74.0 in
GROUND CLEARANCE	10.0 in	9.3 in	9.1 in
APPROACH/DEPART ANGLE	42/33 deg	30/30 deg	32/24 deg
TURNING CIRCLE	40.8 ft	44.6 ft	38.7 ft
CURB WEIGHT	4,600 lb	5,838 lb	5,874 lb
WEIGHT DIST, F/R	52/48%	51/49%	52/48%
TOWING CAPACITY	3,500 lb	7,000 lb	8,100 lb
SEATING CAPACITY	5	5	8
HEADROOM, F/M/R	41.3/40.4/— in	42.2/40.0/— in	38.3/38.9/35.8 in
LEGROOM, F/M/R	41.0/37.2/— in	52.5/41.9/— in	42.9/34.4/28.3 in
SHOULDER ROOM, F/M/R	55.8/56.8/— in	53.7/56.3/— in	61.0/61.1/62.3 in
CARGO VOLUME BEH F/M/R	70.6/31.5/— cu ft	79.5/45.2/— cu ft	81.7/43.0/16.1 cu ft
TEST DATA			
ACCELERATION TO MPH			
0-30	2.8 sec	2.1 sec	2.3 sec
0-40	4.1	3.1	3.6
0-50	6.0	4.2	5.0
0-60	8.2	5.9	6.8
0-70	10.7	7.6	9.0
0-80	15.1	9.8	11.5
0-90	—	12.7	14.7
0-100	—	15.9	—
PASSING, 45-65 MPH	4.4	3.1	3.6
QUARTER MILE	16.3 sec @ 82.5 mph	14.4 sec @ 95.7 mph	15.2 sec @ 91.2 mph
BRAKING, 60-0 MPH	138 ft	122 ft	121 ft
LATERAL ACCELERATION	0.59 g (avg)*	0.71 g (avg)*	0.75 g (avg)
MT FIGURE EIGHT	31.1 sec @ 0.49 g (avg)*	28.7 sec @ 0.59 g (avg)*	27.8 sec @ 0.61 g (avg)
TOP-GEAR REVS @ 60 MPH	2,000 rpm	1,700 rpm	1,500 rpm
CONSUMER INFO			
BASE PRICE	\$42,690	\$120,825	\$84,820
PRICE AS TESTED	\$45,730	\$125,075	\$84,820
STABILITY/TRACTION CONTROL	Yes/yes	Yes/yes	Yes/yes
AIRBAGS	Dual front, front side/head	Dual front, front side, f/r curtain	Dual front, f/m side, f/m/r curtain, front knee
BASIC WARRANTY	3 yrs/36,000 miles	4 yrs/50,000 miles	3 yrs/36,000 miles
POWERTRAIN WARRANTY	5 yrs/60,000 miles	4 yrs/50,000 miles	5 yrs/60,000 miles
ROADSIDE ASSISTANCE	5 yrs/100,000 miles	Unlimited	2 yrs/25,000 miles
FUEL CAPACITY	22.5 gal	25.4 gal	24.6 gal
EPA CITY/HWY/COMB ECON	16/20/18 mpg	13/14/13 mpg	13/18/15 mpg
ENERGY CONS, CITY/HWY	211/169 kW-hrs/100 miles	259/241 kW-hrs/100 miles	259/187 kW-hrs/100 miles
CO2 EMISSIONS, COMB	1.10 lb/mile	1.44 lb/mile	1.31 lb/mile
RECOMMENDED FUEL	Unleaded regular	Unleaded premium	Unleaded regular
REAL MPG, CITY/HWY/COMB	14.4/17.1/15.5 mpg	17.0/15.3/16.2 mpg	12.3/19.2/14.7 mpg
			*Stability-control limited



TWIST KNOBS Toyota's off-road gizmos such as Turn Assist are on the right side of the center console.



DIFFERENCE MAKER Those three switches mounted on the G550's center stack lock and unlock the differentials, the front, center, and rear, from left to right.



STRONG ARM Unlike the Mercedes or Toyota, the Jeep's four-wheel-drive system is engaged via this beefy lever.



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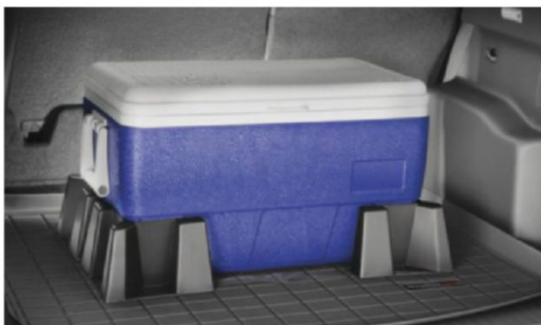
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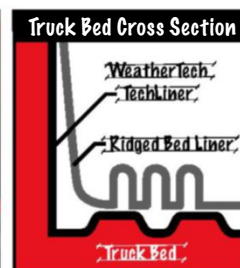
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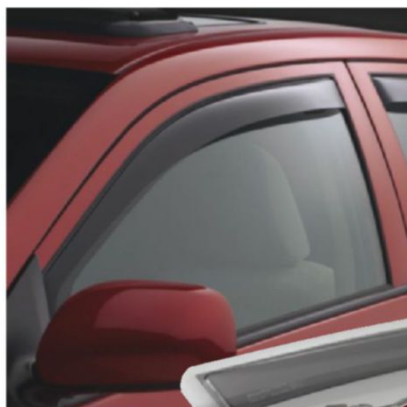
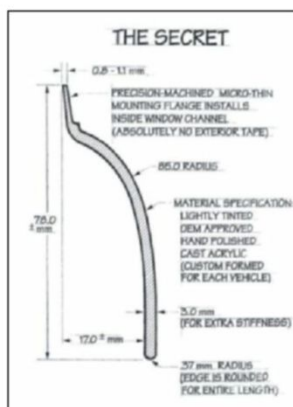
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Words Christian Seabaugh Photographs Robert Guio

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CONCEPT TO COMMUTER

Not much was lost in the Civic Coupe's translation from the concept. It's lower, leaner, and sportier than its sedan sibling.



Did you know you can fit seven people in a Barney-purple mid-'90s Honda Civic? Five inside and two in the trunk. I know this because carless-college-sophomore me drew the short straw and was relegated to the trunk of my friend Sara's Civic sedan—anything to avoid walking in sub-zero temps in the snow. I think just about every current or former college student has a story similar about a Honda Civic—a staple at my alma mater, St. Bonaventure University. There's a good reason for that beyond Honda's reputation for building safe, reliable vehicles: Honda says its legendary compact car is the most popular car among buyers under 35. It's because of those young Gen Y buyers that the 10th-gen Civic lineup, with three body styles and two engine options, not including the upcoming Civic Si and Civic Type R, is larger than it's been in more than a decade. The 2016 Honda Civic Coupe is just the second wave of Honda's full salvo of Civics.

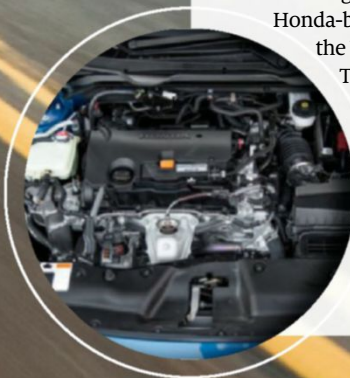
The Civic Coupe breaks the mold set by previous cars, which were little more than Civic Sedans with fewer doors; the new coupe is a shorter, sportier alternative to the more staid sedan. Lower and leaner than the sedan, the Civic Coupe also has increased damper stiffness, firmer spring rates, and unique stabilizer bars to go with more aggressive styling. As with the sedan, the Civic Coupe has two engine options. Our LX tester had the base 2.0-liter I-4 making 158 hp and 138 lb-ft of torque mated to a six-speed manual. A CVT is optional. The "big" engine is actually quite little, a 1.5-liter, turbocharged I-4. The turbocharged mill—a first for Honda-badged vehicle in

the U.S. since the CX500

Turbo motorcycle in the early '80s—produces 174 hp and 162 lb-ft of torque.

A CVT is the only available transmission on the turbo-four, though a six-speed manual will soon be added to the lineup.

Despite the sporty looks,



HUNGRY



Honda Civic 1.5T Manual Prototype Quick Drive

If you're anything like me, you're eagerly awaiting the new Civic Si and Type R. It'll be the first time in the Civic's long history that the U.S. is getting two "Fast & Furious"-ready hot Hondas. The two sport Civics are still a ways off, but I had a chance to sample a prototype of the car that'll fill the gap between the regular Civic and the Si: a six-speed manual-equipped Civic 1.5T sedan.

Joining the Civic's option list sometime this year, the manual-equipped turbo-charged Civic should help keep enthusiasts happy while we await hotter versions of the 10th-gen Civic. The manual transmission makes it easier than ever to take advantage of the engine's torque curve. Honda's turbo-four encourages you to make the most of the 162 lb-ft of torque, all of which is available between 1,700 and 5,500 rpm, by revving it for all its worth while blasting down country lanes. That might not bode well for fuel economy, but it's definitely fun.

The manual transmission continues the Honda tradition of offering light, precise shifts. Although I'd hesitate to call this 1.5T manual combo a sport model, it does certainly make the Civic feel sportier, and it'll appease most until the hotter Hondas arrive. **Christian Seabaugh**

SPORTIER
The 1.5T's
six-speed
manual
gearbox is
a blast to
shift.



relatively quiet, even when turning near 3,000 rpm at 70 mph on the freeway, and unlike the previous-gen Civic Si, it doesn't hang revs on upshifts. The shifter is also pretty slick with light, crisp shift action, though the pedals are poorly spaced for heel-toeing.

The 2.0-liter and CVT pairing will be more than adequate for most buyers, but Honda expects the 1.5-liter engine with the CVT to be the volume powertrain for Civic Coupe buyers. For such a small engine, the 1.5-liter really does deliver the power. Throttle response is pretty good, and the CVT does a great job at keeping the little turbo in the sweet spot. The torque converter helps Honda avoid tuning throttle tip-in to be overly aggressive, making the Civic much easier to drive in heavy traffic.

No matter the engine or transmission combo, the Civic Coupe is an entertaining

the Civic Coupe is just a hair slower than the only other 2016 Civic we tested, a turbo-charged Civic Sedan with a CVT. Zero to 60 took our little blue coupe 7.8 seconds, and the quarter mile took 16.0 at 88.2 mph, just a few ticks behind the Civic Sedan's 7.2 seconds and 15.5 seconds at 92.4 mph, respectively. The Civic Coupe's braking and cornering performance is par for the segment.

The Civic Coupe's competitive set, unlike in the mid-'90s, is rather small. Still, it does a decent job at hanging with its rivals. The soon-to-be-discontinued Scion tC equipped with an automatic does 0-60 in 7.6 seconds, the quarter mile in 15.9 seconds at 86.8 mph, and the figure eight in 27.5 seconds while averaging 0.63 g. The Civic's sole remaining rival is the Kia Forte Koup. The last version we tested, a 201-hp, turbo model with a six-speed manual, did 0-60 in 6.8 seconds, the quarter mile in 15.1 seconds at 93.9 mph, and the figure eight in 26.4 seconds at 0.67 g.

The Honda is most at home on city streets and highways. Our tester's six-speed manual really helps make the most of its 158 hp, allowing the four-pot to sing to its high redline while also allowing you to get off the line at a decent clip. The engine stays

2016 Honda Civic Coupe LX

BASE PRICE	\$19,885
PRICE AS TESTED	\$19,885
VEHICLE LAYOUT	Front-engine, FWD, 5-pass, 2-door coupe
ENGINE	2.0L/158-hp/138-lb-ft DOHC 16-valve I-4
TRANSMISSION	6-speed manual
CURB WEIGHT (F/R DIST)	2,716 lb (62/38%)
WHEELBASE	106.3 in
L X W X H	176.9 x 70.8 x 54.9 in
0-60 MPH	7.8 sec
QUARTER MILE	16.0 sec @ 88.2 mph
BRAKING, 60-0 MPH	118 ft
LATERAL ACCELERATION	0.82 g (avg)
MT FIGURE EIGHT	27.6 sec @ 0.60 g (avg)
EPA CITY/HWY/COMB FUEL ECON	26/38/31 mpg
ENERGY CONS. CITY/HWY	130/89 kW-hrs/100 miles
CO2 EMISSIONS, COMB	0.64 lb/mile

The Civic Coupe is a car that'll grow with its driver.



drive. Although the ride is on the softer side, I without a doubt prefer the sportier suspension setup on the two-door to that of the four-door; the ride is slightly firmer with less roll but still manages to be compliant and comfortable. Steering feedback leaves a little to be desired, as it's exceptionally light, but actual road feel from the front tires bodes well for the sportier Civic Si and Type R.

The rest of the package is as complete as anyone familiar with the latest Civic would expect. It's efficient, netting an EPA-rated 26/38/31 mpg city/highway/combined with the manual (30/41/34 with the 2.0 and the CVT), and it feels more expensive than its sub-\$20,000 starting price. The cabin is roomy and available with tech that Gen Y buyers love, including a full semiautonomous driving suite.

The Civic Coupe is a car that'll grow with its driver, from days cramming teenage buds in the trunk to first jobs and beyond. With the Civic family continuing to grow, it's tough to see a future where the reliable little Honda isn't a big part of young drivers' lives. ■

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GARAGE

Words Motor Trend Editors



Our Mazda MX-5 Miata Club model is fitted with the optional BBS wheels and Brembo brake package.

ARRIVAL 2016 Mazda MX-5 Miata Club Erick Ayapana



“Looks like my weekends for the next 52 weeks are pretty much booked. Can’t wait to hit the road.”
@Erkayapana

EPA CITY/HWY/COMB FUEL ECON
27/34/30 MPG **BASE PRICE** \$29,420
PRICE AS TESTED \$32,820

The odometer on our long-term 2016 Mazda MX-5 Miata Club hadn’t even hit 1,000 miles before staffers bombarded me with questions and suggestions. “How are you going to modify it?” “When are we putting new wheels on this thing?” We don’t often modify the cars in our fleet, but the Miata isn’t like most cars.

Like those eager staffers, a good chunk of Miata owners love to tweak the little roadsters. For proof, just peruse the countless online forums buzzing with MX-5 enthusiasts convincing one another they need to blow their next paycheck on a new set of wheels or fancy coil-overs.

If you’re not the wrenching type, don’t worry.

There’s also a strong case to keep the Miata as is. We’ve spent a ton of time behind the wheel of Mazda’s fourth-generation ND MX-5 in its bone-stock form, including the Japan-spec version with the smaller engine (which is still good). We put it head-to-head against the Subaru BRZ (the Mazda won), and it put up an impressive fight at our 2015 Best Driver’s Car competition, which included two very tough track-focused Germans. The Miata would’ve been crowned our 2016 *Motor Trend* Car of the Year if it weren’t for that pesky (and excellent) Chevrolet Camaro.

Our MX-5 Miata Club slots between the base Sport and the top-of-the-line Grand Touring models. The Club model comes with a limited-slip differential, an upgraded suspension system with Bilstein shocks, and a shock tower brace, making it the sportiest variant in the bunch.

Although it doesn’t have the Grand Touring’s leather seats and navigation system, it does feature most modern necessities, such as Bluetooth connectivity, satellite radio, USB ports, cupholders, LED headlamps, and a pretty good Bose sound system.



The Mazda MX-5 Miata is one of the few cars in the #MTGarage with three pedals.

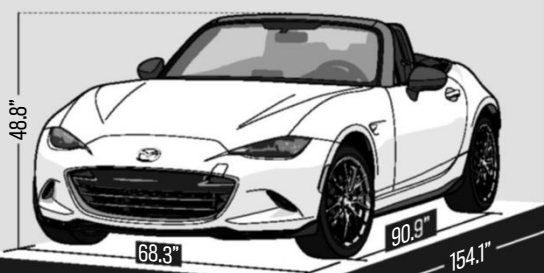


ACURA TLX	UPDATE AUDI S3	CHEVROLET COLORADO Z71	CHEVROLET CORVETTE	HONDA CR-V TOURING AWD	UPDATE HONDA PILOT AWD ELITE	UPDATE KIA SEDONA	KIA SOUL EV+
LAND ROVER RANGE ROVER SPORT SC	MAZDA MX-5 MIATA CLUB ARRIVAL	MERCEDES-BENZ CLA250 4MATIC	MITSUBISHI OUTLANDER SEL UPDATE	NISSAN MAXIMA SR	NISSAN MURANO UPDATE	SUBARU BRZ	

RIDE ALONG FOR UPDATES ON OUR LONG-TERM FLEET

SPECS 2016 Mazda MX-5 Miata (Club)

PAUL LAGUETTE



CO2 emissions 0.65 lb/mi

MT figure eight
25.4 sec @ 0.72 g (avg)

6.0 sec
0-60 mph

14.5 sec @ 93.9 mph
Quarter mile

110 ft
Braking distance, 60-0 mph

Vehicle Layout Front-engine, RWD, 2-pass, 2-door convertible
Engine 2.0L/155-hp/148-lb-ft DOHC 16-valve I-4
Transmission 6-speed manual
Lateral Acceleration 0.95 g (avg)
Curb Weight (F/R dist) 2,313 lb (52/48%)
Energy Cons, City/Hwy 125/99 kW-hrs/100 miles

Lots of bystanders are fans of the Ceramic paint job, which varies from a metallic white to a matte gray depending on the light. Additionally, our car has the optional Brembo brake and BBS wheel package (with Bridgestone Potenza S001 summer tires), which tacks on \$3,400 and also includes the advanced keyless entry system. In all, the total MSRP comes to \$32,820.

Whether our MX-5 gets modified or not, it's easily one of the most fun-to-drive cars in our garage, and the tiny roadster's popularity should grow big time in the next 12 months.



Our Audi S3 takes a well-deserved post-lapping breather. The car was brilliant; the tires took a beating.

2016 Audi S3 Chris Walton



"We let Randy Pobst set a hot-lap time at Big Willow, and it was fast."
@Chapter_34

Service life / 3 mo/4,909 mi
Avg CO2 / 0.80 lb/mi
Energy cons / 139 kW-hrs/100 mi
Unresolved problems / None
Maintenance cost / \$0 (oil change, inspection)
Normal-wear cost / \$0
Base price / \$43,425 **As tested** / \$49,950

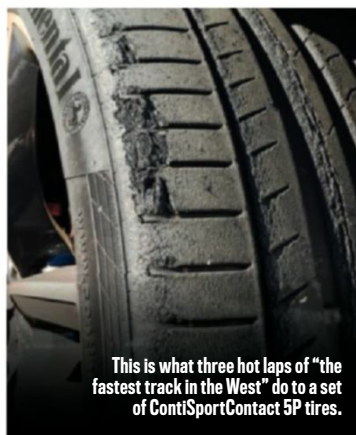


REAL MPG FUEL ECON 24.3 MPG comb.

It didn't take long for us to start enjoying our beloved S3's performance capabilities. Rocketing to 60 mph in just 4.4 seconds is but one of its talents. We had reserved the Big Track at Willow Springs for lapping the Lamborghini Aventador SV and McLaren 675LT, and our gentleman race car driver, Randy Pobst, wanted to first clean the track off and warm up in something. Why, we have just the thing for you, sir. Randy ripped two nearly identical lap times that averaged 1 minute, 35.9 seconds (from the sidelines and with a completely unscientific handheld timer). On our leaderboard, that time puts it just a half second behind the 572-hp 2016

Bentley Continental GT3-R. Not bad for a little turbo four-banger. Indeed, Randy praised that engine and the slick-shifting transmission but said the S3 pitched and rolled too much to put up a really competitive lap. That's when we reminded him that this was a mere S3 and not the highly anticipated RS 3 produced by the Quattro GmbH performance division. Audi keeps teasing, but we're not holding our breath any longer.

Ah, but those few laps took their toll on the S3's Continental ContiSportContact 5P tires. They needed replacements. Not only did all the tread blocks lose their shoulders, but the noise and vibration produced at highway speeds was also excessive. Nine hundred dollars later, we had the tires swapped out during our otherwise-free 5,000-mile scheduled service visit. Incidentally, making a next-day 8 a.m. appointment for this service and tire change couldn't have been easier with the intuitive online portal for our local Audi dealer. Bravo. The 5K service included an oil and filter change plus a slew of vehicle systems inspections. It passed with flying colors.




This is what three hot laps of "the fastest track in the West" do to a set of ContiSportContact 5P tires.



2016 Honda Pilot AWD Elite Scott Evans



 **"The Pilot can feel really heavy at times, but when it does, Sport mode throttle mapping fixes it right up."**
@MT_Evans

Service life / 4 mo/11,301 mi
Avg CO2 / 0.90 lb/mi
Energy cons / 157 kW-hrs/100 mi
Unresolved problems / None
Maintenance cost / \$94.84 (oil change, inspection, tire rotation)
Normal-wear cost / \$0
Base price / \$47,300
As tested / \$47,300

 **REAL MPG FUEL ECON 21.5 MPG comb.**

A small bit of *Motor Trend* SUV of the Year trivia for you: The Honda Pilot wasn't just a finalist—it finished second. The Pilot impressed us with its high-tech features, spacious and easily accessible cabin with seating for eight, comfortable and quiet interior, and all-around versatility. When Honda offered a long-term tester, we didn't think twice.

Its strong showing at SUV of the Year aside, a few months with the Pilot have revealed some weaknesses. Automakers routinely prep vehicles for high-profile events like our Of the Year awards.

We must keep in mind that our testers have been screened prior to arrival. I've been thinking about this lately, as our Pilot, which is functionally identical to the one in SUV of the Year, has shown itself to be less impressive than that SUV.

The most noticeable difference is in the transmission. Shifts happen slower and less smoothly than with the nine-speed Elite I drove at SUV of the Year. Of particular annoyance is the transition

from Reverse to Park, which takes long enough that Honda programmed a message to appear on the dash instructing you to keep your foot on the brake while the transmission ambles its way into Park.

The Honda Sensing suite of driver assistance systems also performs below previous expectations. Rather than holding the relative center of the lane, it ping-pongs between the lane markings and must be constantly adjusted.


On the plus side, our Pilot has been as reliable as we've come to expect. So far, it's gone in for one routine service as prompted by the onboard computer, which set us back \$94.84. The dealer also performed a recall that involved a software update to the instrument cluster. We hadn't noticed any problems, nor have we noticed any improvements, since.

All in all, our impressions of the Pilot to date are positive. We think it's a really good SUV, and we'd still recommend it over several of its direct competitors. It's just not quite the excellent SUV we thought it was.



2016 Mitsubishi Outlander SEL S-AWC Alex Nishimoto



 **"Unless you want to be beeped at constantly, skip the Outlander's Advanced Safety Package."**
@MT_NishiMOTOR

Service life / 6 mo/12,428 mi
Avg CO2 / 0.79 lb/mi
Energy cons / 136 kW-hrs/100 mi
Unresolved problems / None
Maintenance cost / \$102.23 (oil change, inspection, tire rotation)
Normal-wear cost / \$0
Base price / \$27,845
As tested / \$33,095

 **REAL MPG FUEL ECON 24.7 MPG comb.**

Our long-term 2016 Mitsubishi Outlander is as loaded as you can get it. That means it comes with Mitsubishi's suite of advanced safety features, which helped earn the crossover a Top Safety Pick+ award with an Advanced rating in front crash prevention (one grade down from the highest score of Superior) from the Insurance Institute for Highway Safety. But how well do those features work in everyday driving? Some better than others.

My biggest gripe has to do with the lane departure warning system. Even when it feels like

you're within the lane, the system beeps thrice. I've asked a number of other staffers for their opinion, and they agree the system is way too sensitive. I turn it off most days because I get tired of hearing the incessant beeping. Because the system defaults to on, I have to hit the button to turn it off every time I start the car. Luckily, that button is conveniently located on the dash. We complained about the same thing on our 2014 Outlander. I don't

Adaptive cruise works, but it's an older, less advanced system than you'll find in other cars.

expect an automaker to change every little thing in a mid-cycle refresh, but this is one thing I wish Mitsubishi could have tweaked.

I appreciate the forward collision warning, as I commute in stop-and-go traffic. It's given me countless heads-up when the driver in front of me stops short or suddenly. The adaptive cruise control is less useful. Even when set at the closest following distance, it maintains a huge gap. If someone merges into that gap, the system bites the brakes. It's good that it slows down, but I wish it did so more gracefully.

Unfortunately, you can't pick and choose the Outlander's advanced safety features. They're all bundled in the \$1,550 Advanced Safety package (or in our case, the \$5,250 Touring package, which adds content from the Premium package). As helpful as the collision mitigation system is, I couldn't justify getting the package given how seldom I use the other features.

LONG-TERM TEST



Fed up with listening to endless GOP squabbling, I've been using Spotify a lot more lately. I wish I could see who I was listening to and what song they are playing.

2015 Nissan Murano SL AWD William Walker



"Black, white, red—give me anything other than early 2000s burnt orange! Nissan calls it Pacific Sunset."
@MT_DubDub

Service life / 8 mo/17,596 mi
Avg CO2 / 0.89 lb/mi
Energy cons / 155 kW-hrs/100 mi
Unresolved problems / None
Maintenance cost / \$379.40 (oil change, inspection, tire rotation, cabin air filter, engine air filter, brake fluid change)
Normal-wear cost / \$0
Base price / \$39,435 **As tested** / \$41,905

REAL MPG FUEL ECON 21.7 MPG comb.

It's been a little more than 3,000 miles since the Murano went under the knife for its 15,000-mile service. The 15K service includes changing the engine oil, oil filter, and cabin air filter; rotating the tires; and replacing the brake fluid, all for a grand total of \$379.40. My dealership experience at our local Nissan dealer was pleasant, and I was done in less than two hours.

Unlike my previous long-term cars, the Murano doesn't have an indicator when it is time for service. This is a one-time issue that once you discover it

is easily remedied by paying attention to your mileage, but people are busy and on the move. Having that annoying service light is a helpful reminder that your car needs some love.

While I still get looks and thumbs-up from random people, I have not gotten used to the terrible orange color, and I don't think I ever will. Every time I pass a stylish black, white, or red Murano, I hide my face and exhale sadly.



Friends are always surprised by heated second-row seats in a minivan.

2016 Kia Sedona SX Robin Trajano



"The Kia Sedona will electrically close its doors at speed. That's very useful."

Service life / 4 mo/13,139 mi
Avg CO2 / 0.92 lb/mi
Energy cons / 159 kW-hrs/100 mi
Unresolved problems / None
Maintenance cost / \$74.84 (oil change, inspection, tire rotation)
Normal-wear cost / \$0
Base price / \$37,295
As tested / \$42,090

REAL MPG FUEL ECON 21.2 MPG comb.

After spending more time with the Sedona, I'm starting to notice some of its small faults. The interior is quite nicely designed. The styling is nothing to write home about, but it's purposeful and easy to use. Fit is top-notch, and materials are great for the price point, but I don't like the plastic piano black trim on the center console, dash, and door panels. I can't stand how easily it gets scratched up. It is already showing its age after a mere four months and will only get worse. Also, like black exterior paint, the trim is very difficult to keep clean.

The second-row center jump seat is cumbersome to remove or reinstall. It is heavy and oddly shaped without real handles. (Be careful not to wrench your back while taking it out.) Knowing which handle/strap to pull next is a bit confusing, but there are printed instructions on the chair. Once it was removed, though, I was able to easily fit a queen-sized bed frame with a large headboard.



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The Ram proved popular. It easily tackled any job we threw at it.

2014 Ram 1500 EcoDiesel Jason Udy



"The Ram 1500 EcoDiesel convinced this sports car fan of the value of a pickup."
@MT_JasonUdy

At the end of its 13-month tenure in the *Motor Trend* garage, our long-term 2014 Ram 1500 Outdoorsman EcoDiesel Crew Cab 4x4 had traveled just over 32,000 miles. During that time the turbodiesel half-ton pickup was popular among the staff. It served several roles, including making daily commutes to the office and extended road trips, and acted as a support vehicle for various comparisons, a moving truck for employees and friends, a transporter for recreational vehicles, and a car hauler.

On more than one occasion, our Ram 1500 EcoDiesel was used to haul scooters and motorcycles, and it also towed a go-kart trailer, but its most challenging job was when I bought a project car: a 1984 Oldsmobile Cutlass Supreme Brougham. Based on GM's G-body chassis, the 1980s-era midsize

Service life / 13 mo / 32,114 mi

Base price / \$45,905

Options / Air suspension (\$1,695), 20-in black alloy wheels (\$1,400), RamBox (\$1,295), side steps (\$600), Rear Camera and Park Assist group (\$595), Uconnect 8.4-in touchscreen with navigation (\$500), spray-in bedliner (\$475), Comfort Group (\$395: heated front seats, heated steering wheel), 9-speaker sound system (\$300), trailer-brake controller (\$230), 3.92:1 axle ratio (\$50)

Price as tested / \$53,440

Avg fuel econ/C02 / 23.2 mpg/0.96 lb/mi

Problem areas / A/C compressor clutch relay, engine oil pressure sensor, NOx reduction catalyst

Maintenance cost / \$775.04 (4-DEF refill; 3-oil change, inspection, tire rotation; 1-fuel filter, rear differential service)

Normal-wear cost / \$0

3-year residual value* / \$27,254

Recalls / Uconnect software, airbag control module, steering wheel wiring harness, rear shock absorbers, transmission case, instrument cluster software



REAL MPG CITY/HWY/COMB FUEL ECON
19.8/27.5/22.7 MPG

*Automotive Lease Guide data

coupe measures 200 inches stem to stern—about as long as a current full-size Dodge Charger but significantly lighter.

With the 3.0-liter EcoDiesel V-6 (rated 240 hp, 420 lb-ft), eight-speed automatic, and 3.92:1 rearend gear ratio, our four-wheel-drive Ram with a 5-foot-7-inch bed has a max tow rating of 8,550 pounds, well under the weight of the classic Oldsmobile and the tandem axle trailer. My new car was located in Lancaster, California, approximately 100 miles from my home in Los Angeles. First I stopped in Inglewood to pick up the appropriate car hauler.

The Ram 1500 EcoDiesel's optional air suspension made hooking the trailer up to the hitch easy. With the air suspension set at the lowest height, we were able to position the hitch ball directly under the trailer tongue before raising it straight up for a simple connection. After the unladen trailer was safely installed, I took it up to Lancaster. With the car loaded onto the trailer, I began the return trip back to Los Angeles.

As we pulled out with the Cutlass in tow, there was a moment of hesitation when I was aware of the mass of the car and trailer. It's a lot like the turbo lag I experienced when accelerating below half throttle. But once we were moving, the torque from the EcoDiesel effortlessly pulled the Cutty. Despite the weight, the Ram rode smoothly and felt planted as we got up to 55 mph.



Chrysler's Uconnect 8.4-inch infotainment system is among the best in the business.





The Ram 1500's 3.0-liter EcoDiesel V-6 provided plenty of power for towing, off-roading, and other truck stuff.

Early on in our time with the Ram 1500 EcoDiesel, the half-ton pickup suffered a few mechanical issues, first a faulty air-conditioning compressor clutch relay, then an erratic oil pressure sensor, and later an issue with a catalytic converter. The clutch relay was stuck in the run position, causing two issues: It wouldn't allow the compressor to cycle on and off, which made it ice over, reducing the effectiveness of the air-conditioning system, and with the compressor held in the run position, even with the engine off, the battery drained when parked for the weekend.

Additionally, the oil pressure light turned on when driving on steep inclines. After a manual check of the oil level and oil pressure tested within parameters, Ram advised the dealer to replace the oil pressure sensor. The issue didn't return. Around 15,000 miles, the check engine light came on due to an issue with a NOx sensor being "below threshold." The dealer replaced a catalytic converter.

The Ram required \$775.04 in maintenance, which included four diesel exhaust fluid refills (8 gallons every 7,500 miles), three oil changes (including 11 quarts of synthetic oil every 10,000 miles), one fuel filter, a rear differential service, and tire rotations. The EcoDiesel returned a 23.2 mpg average. In comparison, our Hemi-powered 2013 Ram 1500 Laramie Crew Cab 4x4 required \$120.94 in maintenance costs over 32,000 miles, which included two oil changes and tire rotations. The Ram Hemi averaged 15.6 mpg. Our 2012 Ford F-150 Lariat 4x4 EcoBoost cost \$208.35 in maintenance costs over 28,000 miles. Those costs include three oil changes, tire rotations, and an engine air filter. The F-150 EcoBoost achieved 14.4 mpg overall.

The EcoDiesel engine achieves significantly better fuel economy than the Hemi engine without giving up much of its towing capability. But buyers considering the EcoDiesel should weigh their needs carefully because in many regions diesel fuel frequently costs more than gasoline. The added cost of DEF fluid should also be considered.

Because of its practicality and functionality, the Ram proved popular for work-related tasks and personal use by many staff members. It traveled to the Rocky Mountains five times, up to the Reno/Lake Tahoe area at least once, and over to Kingman, Arizona. It also spent several days in the Mojave Desert and another day in Indio in nearly 120-degree temps. The Ram 1500 EcoDiesel easily tackled any job we threw at it. ■



2014 Ram 1500 Outdoorsman EcoDiesel 4x4 POWERTRAIN/CHASSIS

DRIVETRAIN LAYOUT	Front-engine, 4WD
ENGINE TYPE	Turbodiesel 60-deg V-6, iron block/alum heads
VALVETRAIN	DOHC, 4 valves/cyl
DISPLACEMENT	182.3 cu in/2,988cc
COMPRESSION RATIO	16.5:1
POWER (SAE NET)	240 hp @ 3,600 rpm
TORQUE (SAE NET)	420 lb-ft @ 2,000 rpm
REDLINE	4,500 rpm
WEIGHT TO POWER	25.0 lb/hp
TRANSMISSION	8-speed automatic
AXLE/FINAL-DRIVE RATIO	3.92:1/2.63:1
SUSPENSION, FRONT; REAR	Control arms, air springs, anti-roll bar; live axle, air springs, anti-roll bar
STEERING RATIO	19.1:1
TURNS LOCK-TO-LOCK	3.0
BRAKES, F; R	13.2-in vented disc; 13.8-in vented disc, ABS
WHEELS	8.0 x 20-in, cast aluminum
TIRES	275/60R20 114S M+S Goodyear Wrangler SR-A

DIMENSIONS	
WHEELBASE	140.5 in
TRACK, F/R	68.6/68.0 in
LENGTH X WIDTH X HEIGHT	229.0 x 79.4 x 75.5-79.6 in
TURNING CIRCLE	39.8 ft
CURB WEIGHT	5,990 lb
WEIGHT DIST, F/R	57/43%
SEATING CAPACITY	5
HEADROOM, F/R	41.0/39.9 in
LEGROOM, F/R	41.0/40.3 in
SHOULDER ROOM, F/R	66.0/65.7 in
PICKUP BOX L X W X H	67.4 x 51.1 x 20.0 in
CARGO VOLUME	38.7 cu ft
WIDTH BET WHEELHOUSES	48.1 in
PAYLOAD CAPACITY	960 lb
TOWING CAPACITY	8,550 lb
GROSS VEHICLE WEIGHT RATING	6,950 lb
GROSS COMBINED WEIGHT RATING	14,500 lb

TEST DATA	
ACCELERATION TO MPH	
0-30	2.6 sec
0-40	4.3
0-50	6.3
0-60	8.8
0-70	11.8
0-80	16.0
0-90	20.8
PASSING, 45-65 MPH	5.1
QUARTER MILE	16.6 sec @ 81.5 mph
BRAKING, 60-0 MPH	126 ft
LATERAL ACCELERATION	0.76 g (avg)
MT FIGURE EIGHT	29.0 sec @ 0.56 g (avg)
TOP-GEAR REVS @ 60 MPH	1,700 rpm

CONSUMER INFO	
STABILITY/TRACTION CONTROL	Yes/yes
AIRBAGS	Dual front, front side, f/r curtain
BASIC WARRANTY	3 yrs/36,000 miles
POWERTRAIN WARRANTY	5 yrs/100,000 miles
ROADSIDE ASSISTANCE	5 yrs/100,000 miles
FUEL CAPACITY	26.0 gal
EPA CITY/HWY/COMB ECON	19/27/22 mpg
ENERGY CONS, CITY/HWY	199/140 kW-hrs/100 miles
CO2 EMISSIONS, COMB	1.01 lb/mile
REAL MPG CITY/HWY/COMB	19.8/27.5/22.7 mpg
RECOMMENDED FUEL	Diesel



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Staffers praised the ride quality of its non-magnetic suspension and tall tire sidewalls.

2015 Chevrolet Tahoe LT Frank Markus



"This big red rig has proven the wisdom of saying 'no' to 4WD, 22s, rear entertainment, and other non-essential frippery." @MT_Markus

You know how sometimes the planets just align and everything goes right? Kismet. That's exactly what happened when we ordered our 2015 Tahoe. Somehow, uncharacteristically for us, we exercised almost unprecedented restraint on the order sheet. Rather than grabbing the shiny, pretty top-shelf LTZ model (\$62,280 to start, \$78,025 fully optioned!), we opted for a sensible mid-grade \$51,950 LT and then added just \$3,930 in very carefully selected options.

In another remarkable twist of fate, for once none of those options upsized the wheels. Our downright petite 18-inchers were wrapped in tall, 65-series,

Service life / 15 mo / 36,685 mi

Base price / \$51,950

Options / Luxury package (\$2,940: passive entry, heated second-row seats, front and rear park assist, side blind-zone and lane departure alert), Crystal Red Metallic paint (\$495); Chevrolet MyLink audio system (\$495)

Price as tested / \$55,880

Avg fuel econ/C02 / 18.2 mpg/1.07 lb/mi

Problem areas / OnStar module (GPS vehicle position inaccuracy) **Maintenance cost** / \$142 (4-oil change, inspection, tire rotation; 1-cabin air filter)

Normal-wear cost / \$0 **3-year residual value*** / \$27,381 **Recalls** / Interior fuse block decal

REAL MPG CITY/HWY/COMB FUEL ECON
15.9/22.6/18.4 MPG

*Automotive Lease Guide data



squooshy-side-wall tires that paid equally big dividends in ride quality and likely buzz/squeak/rattle abatement. Another surprisingly bold sacrifice: \$3,000 worth of mass-, friction-, and inertia-adding four-wheel-drive. We figured we'd never need it in Southern California, and we ended up not needing it in Michigan, either, where a \$745.20 set of Bridgestone Blizzaks got us through the deepest snow with no trouble. We're told most of the Tahoes, Suburbans, and Yukons used for Metro Cars and Uber Black duty here in southeast Michigan are also rear-drivers, owing to their superior fuel economy.

On that front, our Tahoe aced its Real MPG test, scoring 15.9/22.6/18.4 mpg city/highway/combined—rounding to precisely the EPA's 16/23/18 rating. And then, somehow the truck's three different official chaperones and myriad photo-crew drivers managed to average 18.2 mpg over 36,685 miles in 15 months under conditions ranging from scorching deserts to frigid winters. That's a strong testament to the efficiency of the cylinder-deactivating EcoTec3 5.3-liter small-block V-8 and two-wheel drive. (Expect even better results when the six-speed automatic gets

One of the four hooks that connect the outer bezel to the handle broke when a heavy cargo item fell on it. That bezel isn't sold separately; you must replace the entire panel for \$359.16. We epoxied the part instead.





The Tahoe's 5.3-liter V-8 went about its business faultlessly, quietly shouldering any load we burdened it with, asking for only minimal maintenance in return.

upgraded to eight or 10 ratios.) Scanning our long-term back catalog, the closest full-size competitors were all 4x4s, and their economy shows it: our 5.6-liter V-8 2011 Infiniti QX56 averaged 15.3 mpg, and the Tahoe's Yukon forebear (5.3-liter, four-speed auto) managed just 13.9 mpg. A 2013 Mercedes GL350 BlueTec diesel averaged 21.1 mpg, which would save you about \$200 in fuel over 36,000 miles of driving (using the national average prices for regular unleaded and diesel), but the AdBlue emissions-control fluid consumed over that period would cost considerably more than that. And if global warming is your fetish, the 16 percent fuel-economy savings with carbon-rich diesel boils down to just 1.3 percent CO2 savings.

Our Tahoe's maintenance was dirty cheap—\$142, thanks to Chevy's complimentary scheduled maintenance, which covers the cost of scheduled oil and filter changes, tire rotations, and multipoint inspections during the first two years or 24,000 miles. (They don't cover the \$70 cost of a recommended cabin air filter change at 22,500 miles, so that's included in our official tally.) But even if we'd paid retail for the first three stops, the total for the first four scheduled maintenance stops would have been \$299.11, with a fifth \$127 service coming due at 37,500 miles. That's still a tiny fraction of the GL350's \$1,466.97, the QX56's \$686.00 (will this drop when the mechanically identical 2017 Nissan Armada arrives?), and even that 2007 Yukon's \$587.51 (adjusted from our 20,076-mile service life to 30,000 miles to match the others and to 2016 dollars). A final cost point worth noting: Our truck's ALG projected three-year residual value of 49 percent is closing in on the Infiniti's 52 percent and the Mercedes' 54 percent—a huge improvement over our last-gen Yukon's 42 percent. Oh, and had we opted for a base LS the residual would have been 50 percent.



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Fountain, CO • July 9-10

Charlotte Motor Speedway
Charlotte, NC • July 30-31

Circuit of the Americas
Austin, TX • August 6-7

Road America
Elkhart Lake, WI • August 27-28

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2015 Chevrolet Tahoe LT

POWERTRAIN/CHASSIS

DRIVETRAIN LAYOUT	Front-engine, RWD
ENGINE TYPE	90-deg V-8, alum block/heads
VALVETRAIN	OHV, 2 valves/cyl
DISPLACEMENT	325.2 cu in/5,328cc
COMPRESSION RATIO	11.0:1
POWER (SAE NET)	355 hp @ 5,600 rpm*
TORQUE (SAE NET)	383 lb-ft @ 4,100 rpm*
REDLINE	5,800 rpm
WEIGHT TO POWER	15.0 lb/hp
TRANSMISSION	6-speed automatic
AXLE/FINAL-DRIVE RATIO	3.08:1/2.06:1
SUSPENSION, FRONT; REAR	Control arms, coil springs, anti-roll bar; live axle, coil springs, anti-roll bar
STEERING RATIO	17.3:1
TURNS LOCK-TO-LOCK	3.4
BRAKES, F; R	13.0-in vented disc; 13.6-in vented disc, ABS
WHEELS	8.5 x 18-in, cast aluminum
TIRES	265/65R18 112T M+S Goodyear Assurance CS Fuel Max

DIMENSIONS

WHEELBASE	116.0 in
TRACK, F/R	68.7/68.7 in
LENGTH X WIDTH X HEIGHT	204.0 x 80.5 x 74.4 in
GROUND CLEARANCE	7.9 in
APPROACH/DEPART ANGLE	15.5/23.2 deg
TURNING CIRCLE	39.0 ft
CURB WEIGHT	5,338 lb
WEIGHT DIST, F/R	50/50%
TOWING CAPACITY	6,600 lb
SEATING CAPACITY	8
HEADROOM, F/M/R	42.8/38.7/38.1 in
LEGROOM, F/M/R	45.3/39.0/24.8 in
SHOULDER ROOM, F/M/R	64.8/65.1/62.6 in
CARGO VOLUME BEH F/M/R	94.7/51.6/15.3 cu ft
PAYLOAD CAPACITY	1,762 lb
GROSS VEHICLE WEIGHT RATING	7,100 lb
GROSS COMBINED WEIGHT RATING	12,000 lb

TEST DATA

ACCELERATION TO MPH

0-30	2.2 sec
0-40	3.3
0-50	5.0
0-60	6.7
0-70	8.7
0-80	11.4
0-90	14.4
0-100	17.7
PASSING, 45-65 MPH	3.4
QUARTER MILE	15.1 sec @ 92.0 mph
BRAKING, 60-0 MPH	125 ft
LATERAL ACCELERATION	0.77 g (avg)
MT FIGURE EIGHT	27.9 sec @ 0.72 g (avg)
TOP-GEAR REVS @ 60 MPH	1,300 rpm

CONSUMER INFO

STABILITY/TRACTION CONTROL	Yes/yes
AIRBAGS	Dual front, front side, f/m/r curtain
BASIC WARRANTY	3 yrs/36,000 miles
POWERTRAIN WARRANTY	5 yrs/100,000 miles
ROADSIDE ASSISTANCE	5 yrs/100,000 miles
FUEL CAPACITY	26.0 gal
EPA CITY/HWY/COMB ECON	16/23/18 mpg
ENERGY CONS, CITY/HWY	211/147 kW-hrs/100 miles
CO2 EMISSIONS, COMB	1.05 lb/mile
REAL MPG CITY/HWY/COMB	15.9/22.6/18.4 mpg
RECOMMENDED FUEL	Unleaded regular

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OK, enough calculator play. What was it like to live with the Tahoe? Its high mileage accumulation attests to its popularity, and many staffers praised the ride quality of its non-magnetic suspension and tall tire sidewalls. Nobody expects a truck like this to corner like a Porsche Cayenne, and it doesn't, but neither does it wallow, pitch, or roll much. It's pretty well buttoned-down and gives plenty of warning when its limits of adhesion are impending, which builds driver confidence. Its interior has withstood the rigors of sharp photo-gear transport with minimal scarring, though a heavy cargo item managed to break a bezel that retains the handle for the far aft under-floor compartment. (Replacing the whole cargo lid would have cost us \$359, so we epoxied it for free.) That compartment proved useful for carrying two trailer hitch ball mounts and their retainer pins, and the power-folding third-row seats were great for quickly converting from passenger to cargo hauling duties. Our Chevy dealers treated us well, always performing only the manufacturer-recommended services and returning the truck clean.

There's virtually no better place in which to spend 11 hours traveling than the thrones of a big GM truck or ute with a 4G LTE Wi-Fi hot spot. The huge center console bin can hold lunch or laptops, and additional pockets on the doors and center console easily swallow all the stuff passengers surround themselves with on a road trip. Road and wind noise are well-hushed, the seats are supportive, there are plenty of places to plug in your arsenal of personal electronics, and the standard Bose premium audio sounds great. Fold all the seats, and there's room for a full-size air mattress for secure onboard camping. Hitch up



The whole purpose of this little raised area is to lift the rear of the floor to the level of the folding third-row seat (a vastly preferable option to the 40-plus-pound removable seats of the previous-generation Tahoes). It provides the perfect place to store receiver hitches with various drops.

your camper, boat, snowmobiles, or quad-runners, engage tow-haul mode, and it'll happily haul them to wherever the family fun is scheduled. Throw in remote start (from your cellphone app or fob), heating for the steering wheel and the front and middle-row seats (part of the \$2,940 lux-pack), and winter tires, and you've got a perfect winter warrior.

Even with the cushier tires, spending more than 36,000 miles on dilapidated California and Michigan roads left the Tahoe with a few occasional creaks and groans, but no buzzes or rattles, and even NPR chatter at reasonable levels tended to drown them out. It's no mystery why this vehicle (and its Suburban and Yukon brethren) account for three-quarters of the mainstream large-SUV market—they do the big jobs their owners assign them at a per-mile price that's hard to beat. But order wisely for best results. ■



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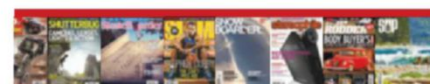
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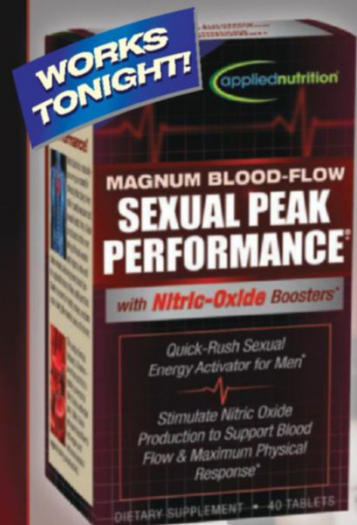
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"We cannot predict the future," says BMW Group design chief Adrian van Hooydonk, "but we can take a stance. That's what our company feels is very important, to try and shape the future before it shapes you."

And the future, says van Hooydonk, is a lot closer than many think. He is convinced the next paradigm for the automobile and individual mobility will be shaped by technologies that will become commonplace in the next 10 years. For a traditional automobile manufacturer, that's a frighteningly compact time horizon, less than two model cycles away.

So what does the BMW Vision Next 100, the first of four advanced concepts to be unveiled this year as BMW celebrates its centenary, reveal about a 100-year-old automaker's idea of the future? "This is a vehicle we imagine to be on the road 30 years from now," van Hooydonk says, "when the big technological changes that are now accelerating have already taken place." Key takeout: The BMWs of 2046 will still have four wheels, and though capable of fully autonomous operation will still have a steering wheel.

"Maybe it's getting harder to surprise people," van Hooydonk says when asked why the Vision Next 100 doesn't look that shockingly different to today's idea of an automobile. "When we did the i8—or the Vision vehicle that went prior to that—the car world was still debating whether it was going to change or not," he says. "Now nobody debates that change is happening. OK, maybe what you see is building on what we have done before. But it is the first time we are showing something this radical for the core of the BMW brand."

While Apple is free to reinvent the car like it did the phone and the watch, BMW, like other legacy automakers that insist their autonomous vehicles will allow the driver to drive, seems trapped by history. "With our brands we typically cater to people who love to drive," says van Hooydonk. "That's why we were very adamant that there should be a steering wheel."

But while the BMW Vision Next 100's format might seem predictably old-school-automaker, the technologies the concept previews are not. BMW has invested heavily in electronics and software development, and much of the work on the Companion, the artificial intelligence system at the core of the Vision Next 100 concept, is being done in-house at BMW's massive FIZ research and development center in Munich.

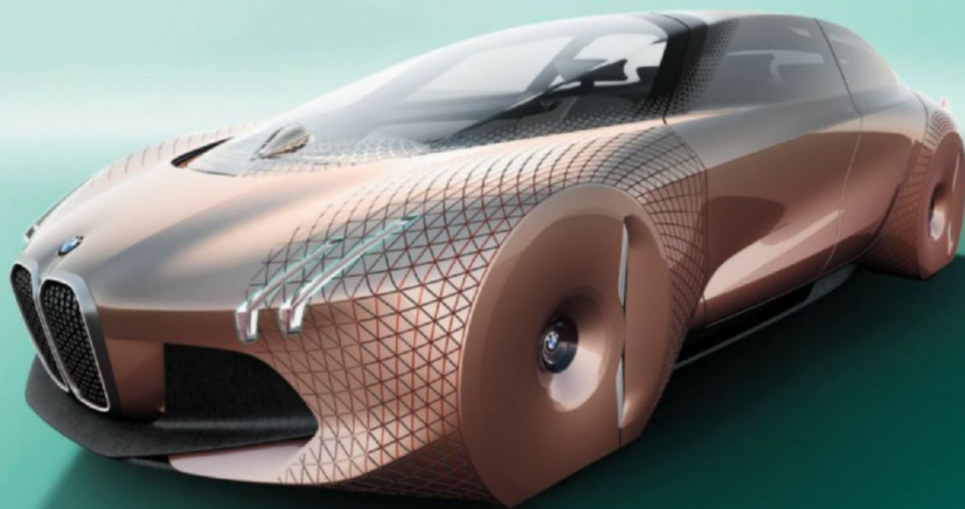
When the Vision Next 100 is operating fully autonomously—something BMW calls Ease

mode—the Companion is raised out of the dash, allowing it, among other things, to signal to pedestrians and other road users that the car is operating autonomously. In Boost mode, when the driver is nominally in control, the Companion sinks into the dash, but still closely monitors both vehicle and driver behavior, offering information, advice, and interventions based on its understanding of vehicle status; externalities such as road, traffic, and weather conditions; and the driver's intentions and capabilities.

"We assume that in the future human beings and machines will become much closer, meld even," van Hooydonk says.

The Alive Geometry that allows the Vision Next 100's front fenders to flex as the faired-in wheels are turned is also powered by BMW software. And van Hooydonk says the hardware will be production-feasible in the future using a still-experimental manufacturing process BMW calls 4-D printing, whereby functionality—what he calls the fourth dimension—is built in to each tiny triangle as it is made.

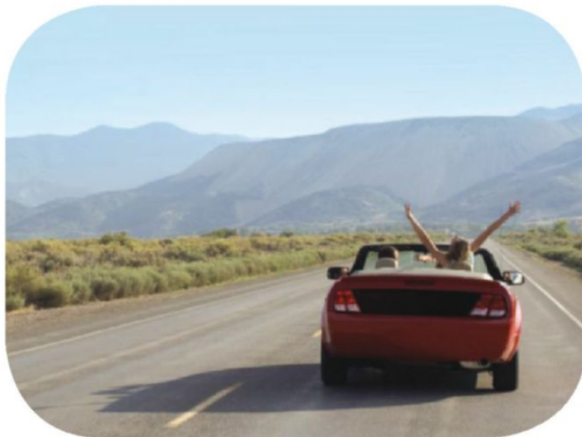
Hip, cool, iconic Apple may indeed redefine the idea of the automobile and personal mobility in the 21st century. But does that mean it can build a better, more technically advanced, higher-quality product than a company like BMW? Not necessarily. The old-school automakers aren't out of the game yet. ■



VISIONARY Design chief Adrian van Hooydonk is defining how the future will look at BMW.



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