

# PRI

PERFORMANCE RACING MAGAZINE



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**INSIDE**

PRI SHOW PREVIEW | KARTING  
CRANKSHAFTS | BRAKES | & MORE



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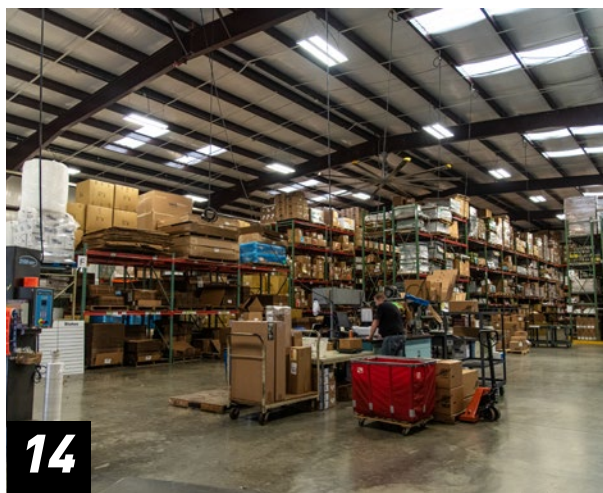




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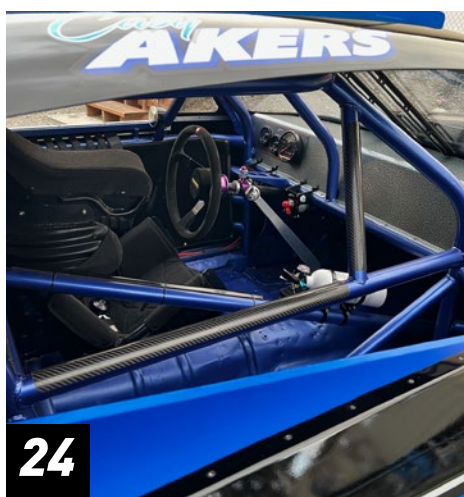
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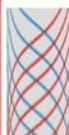


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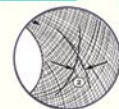
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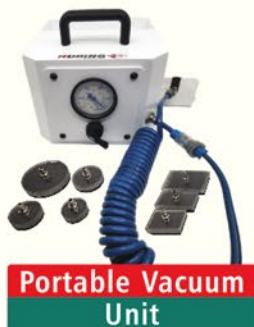
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## FROM THE EXECUTIVE EDITOR

## COLUMBUS 1996

When was your first PRI Show? One of my favorite discussions at the PRI Show is listening to others about how long they have been attending the Show. Some go back to Orlando, some have only known Indianapolis, some first visited PRI in Columbus (mine was in 1996), and some even go back to the very early days in Louisville in 1988 (a few of you are proudly raising your hands right now).

What always strikes me as interesting is just how eager each person is to share with me the number of Shows they've attended, and how willingly they reveal memories from various events. A select few of my favorite highlights from past PRI Shows include the Red Bull Kart Race, the Industry Roundtable, the Twin 25s at Orlando Speedworld, Tony Stewart's first Grand Opening Speaker gig when he was lowered from above the stage to the floor to sit on Santa's lap. Little did we know at the time that Smoke is not a fan of heights, and "Santa" turned out to be his good friend and fellow racer Ken Schrader. Speaking of "smoke," who remembers Smokey Yunick's Smoketron, which literally made some smoke (and maybe even some flames???) of its own. And what about the 50th anniversary celebration of the Chevrolet small block engine where several of the original engineers who were still with us in 1995 were rightfully honored for their contribution to the automotive and motorsports industries. Can you imagine where motorsports would be today if they had not invented the venerable Chevy small block?

One component I'm looking forward to at PRI 2023 is the return of live-action racing with the PRI EV Indy Karting Classic presented by Top Kart USA, which will take place all three days of the PRI Show, in Lucas Oil Stadium. Virtual racing will also be on display as PRI partners with SRO Motorsports Group to present professional simulator races at the Show. Look for more



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details announced in next month's edition of PRI Magazine.

If you haven't already finalized your arrangements for the 2023 edition, set for December 7-9, I highly recommend you complete that by visiting pri2023.com. Starting this month, the new version of the PRI App is available, so download it to any smart device from the App Store or Google Play. Use this as your virtual guide to the PRI Show, where you can save favorite exhibitors, products, and PRI Education and exhibitor-sponsored seminars. Plus, you can add notes and photos in your planner or see the virtual floorplan.

With this October edition, we welcome a new addition to the PRI editorial team, Coordinating Editor Jack Haworth. He is already anticipating his first PRI Show as he brings you the PRI Show Preview, beginning on page 64, along with details about our current lineup of first-time exhibitors, beginning on page 68. Stop by these new exhibitors' booths in December, along with the other 1,000-plus race industry suppliers, to prepare your racing operation for a successful 2024 season! **PRI**

# PRI

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Lily Huang

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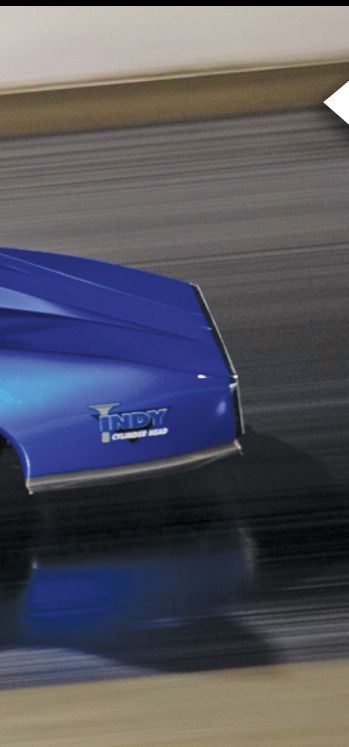


# FEATURED VEHICLES

These go-fast racers were designed to set speed records on land and water.







## 1970 DODGE CHARGER R/T

**CHIP KING** | ROXBORO, NORTH CAROLINA

**RACE SERIES/CLASS:** PDRA (Professional Drag Racers Association) Pro Boost and NMCA (National Muscle Car Association) Xtreme Pro Mod

**ENGINE:** Screw Blown Hemi built by Joe Hornick Enterprises

**CAR:** Chassis built by Jerry Haas Race Cars

**FEATURES:** B&J Racing Transmissions, Carmack Engineering rearend, body and paint by Dreamworks Motorsports

**FACTS:** Crew chiefs are Terry Coyle and Justin Carmack.



## 2016 CHEYENNE TUNNEL HULL

**MIKE AND JESSA FINNEGAN** | ATLANTA, GEORGIA

**RACE SERIES/CLASS:** NJBA (National Jet Boat Association) Quick Eliminator and Unblown Fuel Jet classes

**ENGINE:** 632ci big block Chevrolet built by Mike Miller Racing Engines

**BOAT:** Built by Andy Ralls of Ralls Precision Machine

**FEATURES:** Standard 4.84 bore space tall deck engine with a Brodix cast aluminum block and 11-degree Dart Big Chief cylinder heads. Propulsion comes from a race-prepped American Turbine Dominator jet drive that was assembled by Marine Performance Designs. The hull is made of hand-laminated carbon fiber and weighs just 300 pounds. All the hardware to rig the boat was CNC-machined from 6061 aluminum.

**FACTS:** The boat makes 1,300 horsepower at 7,000 rpm.



# ASK THE EXPERTS

## WORKING WITH MANUFACTURERS ON PRODUCT RETURNS

When it comes to returning a performance part, honesty really is the best policy.

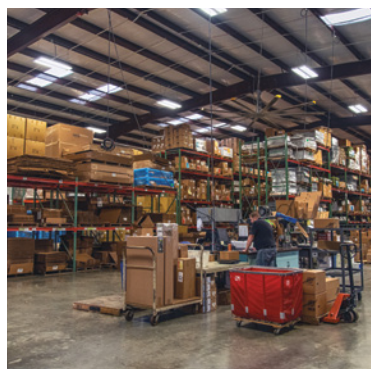
By Drew Hardin

Every manufacturer and retailer has to deal with product returns. But in the racing and performance industry, things can get, well, complicated.

"We had a situation where a guy returned an oil pan that he said he bought two years ago, but it clearly had build data on it from five years ago," recalled Frank Thibodeau of Moroso Performance Products, Guilford, Connecticut. "He had beat the hell out of it. He said it had never been raced, but it clearly had been bottomed out and scraped on the race track."

"We had a guy who bought a Turbo 350, had it for a couple months, and burned it up," said J.C. Beattie Jr. of ATI Performance Products, Baltimore, Maryland. "At first, he said it just burned up, but that sounded wrong with the data he was giving us. As we talked to him, we found out he has an autistic son who loves to do donuts."

"Probably one of the most extreme situations happened to us many years ago," recounted Reggie Wynn, sales and marketing manager for Precision Turbo & Engine and



Turbonetics, Crown Point, Indiana. "A guy crashed his car, and he had our turbo kit on his car. He told us he crashed the car, but he said, 'I'm getting another one. Is there anything you guys can do to help me out?'"

Two of those three customers did what manufacturers recommend when it comes to returning products. "We do our best to help anyone who asks for it, but we really appreciate it when people are honest, when they say, 'Can you help me out?' rather than, 'That's how I got it,'" Thibodeau said. "Manufacturers know their product. They're going to know in most cases how it was used, if it was abused, and they're not being told the truth."

In all three cases—even the questionable oil pan claim—the companies helped the customer. "We're all racers here," Thibodeau said. "We could tell that thing hit something on the race track. But we're still going to help the guy out, because that's the kind of company we are. We want them to buy a Moroso product in the future. It's going to cost us a couple of bucks, but we're going to maintain a customer."

A motorsports retailer may be better set up to handle returns than the product's manufacturer, reported some of our sources. Mike Buca of Design Engineering, Inc. (DEI) clarified, "If the product is being returned for any reason outside of a warranty issue, the proper channel is to go through the place of purchase."

In the case of that ATI transmission, "after getting the rest of the story and discussing it with him, we were able to make the repair, and everyone was happy at the end of the day," Beattie said. "We're a family-owned business, and we try to work with people. In today's world, a lot of times the manufacturer might need that part back to sell it anyway. As long as you bought it from us, and it's not really old, installed, or broken, we'll usually take it back."

### HANDLING THE RETURN

"If the product is being returned for any reason outside of a warranty issue, the proper channel is to go through the place of purchase," said Mike Buca of Design Engineering, Inc. (DEI), Avon Lake, Ohio. "Fortunately, because our defective rate is well under 1%, our distributors are not seeing many DEI products being returned. Also, between our website and training of personnel at the distributor level, the chance of a consumer buying the wrong product is also minimal."



Reggie Wynn of Precision Turbo & Engine and Turbonetics appreciates a customer who is honest when returning a product. "There have been times I've bent over backwards to help out guys who were completely honest with me."

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"If you bought a product from Summit or JEGS, they're set up to handle returns," Thibodeau pointed out. "They're probably going to have that part in stock, so they can get you something brand new, right out of the box, whereas a manufacturer may not be set up to do that. We can do it, but we don't have an automated, streamlined process."

That's one reason some manufacturers ask for a restocking fee. "Let's say a damper comes back, and the packaging is no longer usable, the directions are gone, maybe a decal is missing, stuff like that. We do have to repackage stuff, and it's not zero cost to us to get your part back. We cannot just toss it right in a shipping box and send it back out," Beattie said.

For online retailers and other customers who buy in quantity, manufacturers offer stock adjustment programs to handle bulk returns. DEI, for example, has a stock adjustment program that's "based on how much they bought through the year," Buca said. "Say they bought some products that didn't sell. They can do a once-a-year return on that against another order. It's usually a two-for-one. So if they want to return \$100 worth of product, they have to order \$200 more of a different product. Then we take that inventory back, as long as it's new and in saleable condition."

ATI, too, handles bulk returns and stock adjustments from Summit, JEGS, and other retailers. "They might have 30-40 things to send back once a quarter," Beattie said. But, he added, "that's a different story" than direct returns from end users. "We really don't get a ton of returns, maybe less than five a week. We don't do RMA numbers—that tells you how small the amount of returns are."

### RETURN MERCHANDISE AUTHORIZATION

What Beattie is referring to is a return merchandise authorization number, which most companies ask their customers for

when initiating a return. This helps identify and track the part as it goes through the return process.

At Moroso, "we call it an RA number, and we recommend you write it on the outside of the box," said Thibodeau. "That way when it gets to our returns people, we know there's already something written up about it. Otherwise, the product could sit for a few days while we try to get in touch with the customer. Contact the manufacturer first, tell them what you want, and it'll speed up the process."

Thibodeau said he's surprised at the number of customers who return products "with no note inside, no return address or phone number. It's amazing that a guy will buy a \$2,000 dry sump pump and will send it back with no information."

Thibodeau offered one more tip: "We like to see clean parts coming out of a box. You want to make it in as good a shape as you can for the manufacturer to go through, so they don't have to spend a lot of time cleaning it. It goes a long way if you can do something a little helpful for the next person. Usually, you get a better result than you would normally. But there again, we're going to help people either way because that's just the type of company we are." **PRI**

### SOURCES

**ATI Performance Products**  
atiracing.com

**Design Engineering, Inc.**  
designengineering.com

**Moroso Performance Products**  
moroso.com

**Precision Turbo & Engine**  
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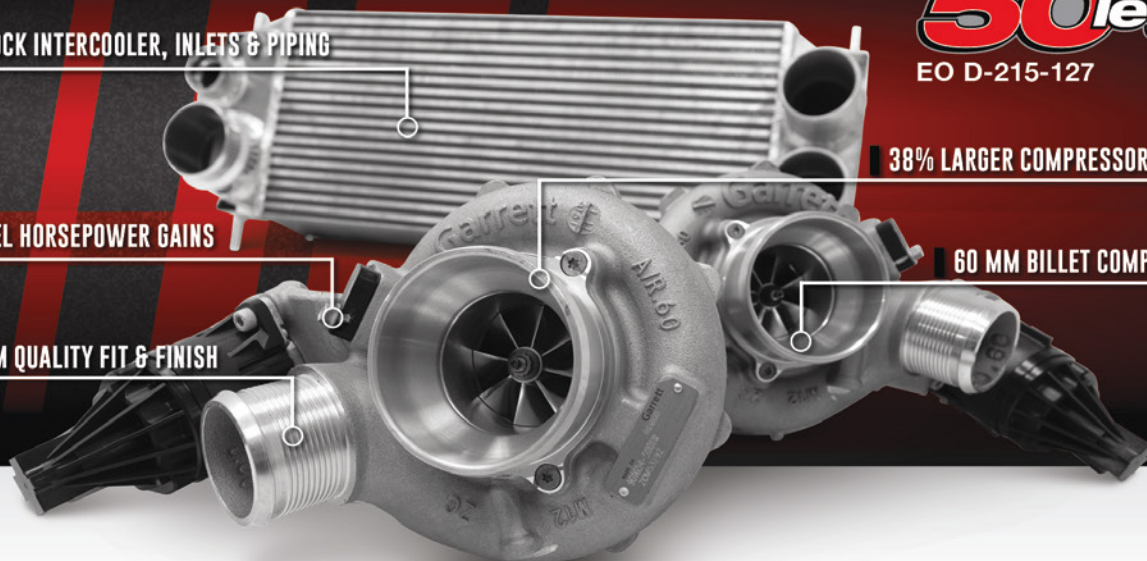
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# STOP DOING THAT...DO THIS INSTEAD

## CHOOSING THE CORRECT TIRE SIZE FOR YOUR ROAD RACING VEHICLE

Maximizing the footprint may be attractive, but properly sizing your tires can improve their longevity, thermal efficiency, and overall grip.

By Bradley Iger

When it comes to a race car's performance potential, the buck stops where the rubber meets the road. All the horsepower in the world isn't worth much if it can't effectively be translated into forward motion, so it makes sense to do whatever it takes to increase mechanical grip. But while it may seem counterintuitive at first glance, that doesn't always mean that a wider tire is the right answer.

"One of the most common mistakes we see racers make is the assumption that bigger is better," explained Jay Chapman of Goodyear Race Tires, Akron, Ohio. "Folks often want to put the biggest possible rear tire on rear-wheel drive cars, but in many cases a square setup, where the same size tires are being used at both the front and the rear, will work better in those applications. You can definitely 'over-tire' a car."

Over-sizing the tires for a given wheel and platform can not only lead to clearance issues that can cause the tire to rub on the inside of the fender or the outside of the fender well when the suspension compresses, it can also create other, less obvious problems that may negatively impact the car's performance.

"If the wheel isn't wide enough for the tire that you're trying to use it with, it can cause the tire to 'crown,' where the center of the tire is higher than the rest of the surface, and that prevents it from creating a proper footprint," Chapman said. "At that



point you're not utilizing the tire as it was designed."

Meanwhile Drew Dayton of Yokohama Tire in Santa Ana, California, pointed out that over-sized tires can also create more work for the car. "You're not only losing some responsiveness, there's also a weight disadvantage because wider tires are going to be heavier, and that's especially important when we're talking about rotational mass. There's also the potential for a wider tire to create more aerodynamic drag, which could also negatively affect lap times."

Using an under-sized tire can create problems, too. Although it's a less common occurrence, the supply chain challenges we've collectively seen over the past few years have recently made this situation more prevalent.

"In that situation, the tire can get overheated more easily because it can't disperse the heat across the tire as effectively," said Chapman. "Sometimes people try to help mask this by increasing air pressure, but that also affects tire performance across the board."

Dayton also noted that switching

"One of the most common mistakes we see racers make is the assumption that bigger is better," said Goodyear's Jay Chapman. Not only can a tire that's too big create clearance issues, it can also negatively affect the tire's footprint.

up tire widths can have a significant effect on the overall dynamic balance with certain platforms. "The relationship between the front and rear is something we focus on a lot with the Porsche GT3 Cup car, for example, because they're really sensitive to changes. You can end up fighting a lot more oversteer or understeer if you disrupt that balance."

Chapman pointed out that while the rulebooks of most spec classes and upper-level series require all competitors to use a particular tire, there are areas of grassroots and sportsman-level racing where racers have room to dial in their setups a bit more, and tire sizing can make a significant difference in a team's competitiveness.



Some race series do allow a certain amount of latitude in tire size, said Jay Chapman of Goodyear, which can enable teams to dial in the car's responsiveness by using tire height to adjust gear ratios for a particular track.



"In SCCA Touring classes like T3 and T4, there's a tire maximum width rule, but the overall diameter of the tire can be adjusted a little bit. That effectively allows a team to adjust their gear ratios to optimize the car for a particular track. If it's a shorter track, for instance, you might want to switch to a smaller tire to come off of the turns quicker, or maybe you want a taller tire for a longer track in order to get down the straights without running out of gear."

Dayton said that in situations where none of the available tire sizes are ideal for the wheels being used, determining which tire to use in competition occasionally comes down to the data collected during practice sessions. "For example, at Pikes Peak this year we had a team that had these really cool carbon fiber wheels that required a pretty unique rear tire size. That gave us two options: a soft compound 300/60R18, or a medium compound 320/60R18. We ended up testing both tires on the same set of wheels to figure out what the trade-offs were going to be, and ultimately which tires would produce better lap times. In that case we ended up going with the wider tire with the harder compound."

Wheel and tire manufacturers can be a great source of information for racers who are looking to ensure that they're getting tires that are sized appropriately for the wheels they're being mounted on, but Chapman said that competitors should also do some fact-finding of their own to verify that everything is copasetic. "Tire temperatures and air pressure are the most basic way to get information, but I think they're also the key to determining what's going on with the tire. With that you can make sure you have the proper spread from the inside to the outside of the tire, and that your psi gain is where it's supposed to be." **PRI**

## SOURCES

**Goodyear Race Tires**  
racegoodyear.com

**Yokohama Tire Corp.**  
yokohamatire.com

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# EDITORS' CHOICE

Hundreds of new product announcements cross the desks of PRI editors each month. Following are our top picks for October.

By Mike Magda

## GLOBAL B CUSTOM TUNING SUPPORT

### HP TUNERS

[hptuners.com](http://hptuners.com)

Performance enthusiasts driving popular GM vehicles like the C8 Corvette and Cadillac CT4-V Blackwing have long been at a disadvantage to improve tuning because of security restrictions built into the cars' computers.

Engineers at HP Tuners in Buffalo Grove, Illinois, have now cracked the codes, and the company is offering comprehensive diagnostics and custom calibration solutions for GM vehicles running the Global B control modules.

"Performance shops and anyone wanting to get more out of the vehicles have been asking for this," said Chris Holt.

Currently available to approved resellers, these services enable access to HP Tuners' VCM Suite software for diagnostics and tuning via the OBDII port using the latest generation of MPVI3 interface. Once their ECUs and TCMs are upgraded, professional tuners can access and edit hundreds of engine and transmission parameters.

"It will allow much more modifiable parameters in the ECU so you can get more complex parts to work, like superchargers, twin-turbo kits, and nitrous," explained Holt. "Previously, you were able to add all those



components, but you weren't able to do as much tuning as is needed to optimize these parts."

HP Tuners will soon offer custom tuning support for the full lineup of GM Global

B controllers covering the most popular models. This includes new generations of the E90, E01, and E66 ECMs along with the remainder of the T93 TCM support.



## PRO BRACKET RACE TORQUE CONVERTER

### SUMMIT RACING

[summitracing.com](http://summitracing.com)

**A**vailable in 8-, 9- and 10-inch diameters, these new Pro Bracket race torque converters from Summit Racing are designed for weekend warriors and professional bracket racers looking for performance right away.

"Most bracket race torque converters are custom builds that can take weeks to get. Our Pro Bracket converters offer racers in-stock options they can order and get in a few days," said Mike Schmidt.

Targeted toward engines displacing 327 to 555 cubic inches, these converters deliver stall speeds ranging from 4,400 to 6,000 rpm. They fit GM TH350 and TH400 transmissions in addition to GM Powerglides that have been equipped with a Turbo input shaft.

"In back-to-back testing using a 9-second small block car, one of our converters was within 200 rpm and a tenth of a second of the custom-built unit originally in the car. We even created a stall-speed guide to help racers choose a Pro Bracket converter based on vehicle weight, horsepower, and cubic inches," added Schmidt.

The converters feature a furnace-brazed pump and turbine, dual anti-balloon plates, TIG-welded blades, and Torrington bearings. There are models for use with .090-, .125- and .250-inch-thick motor plates. All converters are fully computer welded and balanced.



## BILLET ALUMINUM PORSCHE PEDAL ASSEMBLY

### PENTA MOTORSPORTS

[penta-motorsports.com](http://penta-motorsports.com)

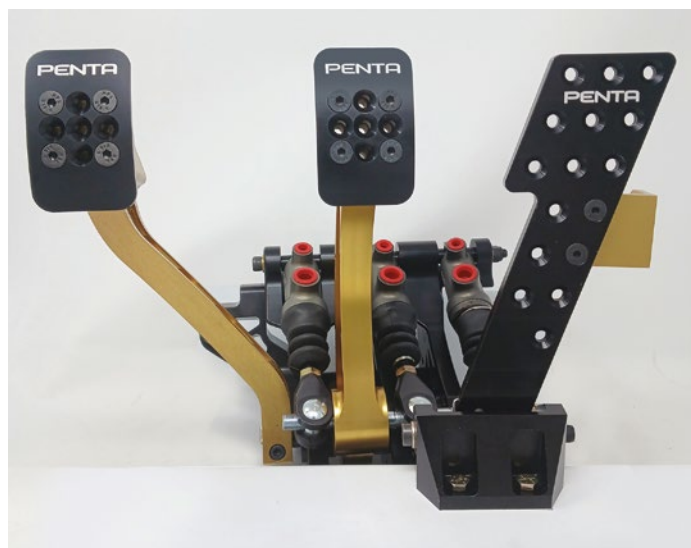
**A** new Penta Motorsports pedal assembly for 1963 through 1989 Porsche 911 vehicles offers position adjustability to achieve optimum heel-toe actuation for drivers on road courses. Other benefits include setting the front/rear brake balance more accurately, and ability to mount Tilton 78 Series master cylinders for brake and clutch action on the unit itself for maintenance and security.

"We initially developed the pedal assembly for use in the 1974 Porsche RSR that we compete with on several vintage racing circuits, and we've had other Porsche racers ask about getting an assembly for their cars. So, the decision was made to go into production," explained Steve Sanett from the Moorpark, California-based company.

The Penta assembly is a bolt-in replacement for the factory steel units. The truss-style pedal arms and base have been designed using FEA (finite element analysis), and they are precision CNC-machined from 6061-T6 aluminum followed by gold and black anodizing.

Key attributes include the use of precision ball-bearing pivots instead of OEM brass bushings and "clockable" 32-spline shafts (plus multiple pedal pad positions) facilitating pedal placement to suit the driver.

"Optimum driver comfort is important in endurance racing, and the adjustability of this assembly facilitates tailoring pedal position to best suit each driver," added Sanett. "This is critical for optimum heel/toe downshifting. The ability to set the ideal front/rear brake balance is also an important benefit."



## LASER CHAIN AND SPROCKET ALIGNMENT TOOL

### ***SPEEDWAY MOTORS***

[speedwaymotors.com](http://speedwaymotors.com)

Getting the chain and sprocket aligned on a competition kart or mini-sprint car is just as important as setting the driveline angles on a race car. Speedway Motors in Lincoln, Nebraska, developed a laser tool to make sure there is no drag in the system.

"We had several racers that ran in classes that used chains and recognized a problem. By getting the sprockets correctly lined up, the chain will run freely. This will also help in wear and tear and possibly fewer DNFs," said Greg Nicol.

The tool helps the racer align the edges of both front and rear sprockets and is compatible with 35, 40, 219, 520, and 530 chain sizes. A laser with LR41 button-cell batteries is included, so there's no need for additional shopping to find a light that will work. The laser holder is CNC-machined from aluminum, and there is a brass laser sight to ensure accuracy in the alignment process.

"We worked with several different classes and teams to get the best product we could," added Nicol. "The racers that have purchased them have all been impressed with them and think it is a high-quality tool."

The tool's versatile design makes it useful in the pits for mini-, micro and Lightning sprints as well as karts and quarter midgets. The clamp-on feature allows the user's hands to remain free for adjusting the chain and sprockets.



## SPINTRIC AIR/OIL SEPARATOR

### ***ARE DRY SUMP SYSTEMS***

[drysump.com](http://drysump.com)

Spintrix Technologies, a division of ARE Dry Sump Systems in Loomis, California, has a new axial flow version of the company's line of air/oil separators for dry sump systems that can be mounted vertically.

"These passive units mount in-line, between the scavenge pump and the dry sump oil tank, and separate up to 80% of the air that is normally returned into the tank," said Gary Armstrong. "The separated air is then returned to the very top air gap in the tank, resulting in more efficient lubrication, cooling, and pressure to your racing engine."

Although simple looking, the separator is a sophisticated design with several complex channels that allow "centripetal air separation." The oil traveling back to the tank is the only moving part in the Spintrix separator. The internal centripetal force is generated by the design of internal components that forces the air out of the oil prior to entering the tank.

The separator can be mounted anywhere in the scavenge return line. One of the advantages of a stand-alone separator, as opposed to one integrated into the dry-sump pump, is that it is easier to mount the pump if packaging is a critical issue.

ARE has also expanded its dry-sump tank line with new models featuring CNC-machined aluminum castings that are heat-treated to T6.





## NEXT GEN 8385 TURBOCHARGER

### PRECISION TURBO AND ENGINE

[precisionturbo.net](http://precisionturbo.net)

**T**he Next Gen 8385 turbocharger from Precision Turbo and Engine in Crown Point, Indiana, is said to provide a 15% improvement over the previous model and carries a 1,700-horsepower rating.

“Our older Gen 2 8385 was a very high-performing unit, setting records in different classes in the import/sport compact scene for different engine platforms like 2JZ and 4g63,” said Reggie Wynn. “With our racers asking for more power and efficiency, it made sense to design our new 8385 Next Gen turbocharger.”

Specs for the turbo include 83-mm compressor wheel inducer, 115-mm compressor wheel exducer, 90-mm turbine wheel inducer, and 85-mm turbine wheel exducer. Recommended max speed is 118,540 rpm.

“This turbo features new aero technology for the compressor wheel, including a newly designed compressor housing. This new efficient design provides 15% more flow,” explained Wynn. “That means more power and more energy driven by the turbocharger.”

Other features include high-flow 11-blade turbine wheel and air/oil-cooled opposed angular-contact ceramic ball bearing center section. The compressor cover includes a machined speed-sensor port. The turbo is available with either T4 divided or SSV-band flanges and in different A/R ratios. This turbo is legal for several racing sanctions.



## HONDA K20Z3 GASKET KIT

### COMETIC GASKET

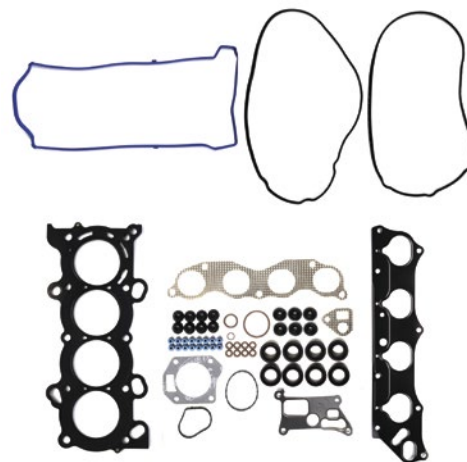
[cometic.com](http://cometic.com)

**T**he new Street Pro top-end gasket kit from Cometic Gasket in Concord, Ohio, brings race-proven MLS technology to the budget-minded racer running a Honda K20Z3 engine. Street Pro gasket kits are constructed from multiple layers of stainless steel for strength, along with excellent rebound and corrosion-resistant characteristics.

“Racers will greatly benefit from this K20Z3 kit as it ensures continuous aftermarket support,” said Brendan Chess. “Cometic also can provide a wide range of head gasket variations of different bore sizes and thickness.”

The outer layers of the MLS head gaskets are coated with a proprietary high-temperature coating to create a heat-resistant seal to withstand extreme cylinder pressures. They are compatible with aluminum heads and iron or aluminum blocks.

“What sets our product apart from others in the field is we offer the flexibility to change the bore size and thickness of the head gasket according to your specific requirements,” explained Chess. “Our ultimate aim is to ensure a perfect fit and seal, giving you complete confidence in the performance and reliability of your engine.”



# FAST MOVERS

A look at some of the country's in-demand motorsports products and services by region and racing segment.

By Dana Ford

**M**otorsports retailers and service providers are constantly tracking the latest parts and trends to give their customers a competitive edge. For the latest on which products and services are moving the retail needle, we present the following sales snapshot from shops across the US.

## TAPOUT TUNING

Plain City, Ohio

Tapout Tuning is a premier tuner business specializing in the Cadillac 3.6-liter twin-turbo LF4 engine. It provides parts, full installation service, custom in-house dyno tuning, and remote tuning solutions for customers from all over the world. About 80% of its customers are racers, primarily road racing or drag racing.

The fast-moving parts and services at the Tapout Tuning shop are the installation and tuning of the company's personally designed downpipes, carbon fiber trim pieces, and cold air intakes, in addition to Pure turbochargers, and Swift Sport lowering springs.



Its customers choose these parts because they are developed specifically for the Cadillac platform by the Tapout Tuning staff. The downpipes vastly improve the sound of these vehicles and also serve to produce significant horsepower gains. The Tapout Fuel cam, when used in combination with a few other fuel system modifications, allows customers to run ethanol in their vehicles. With the Purple Belt Performance Package, customers can make up to more than 100 whp over the power that can be produced on regular pump gas.

As far as marketing these products, according to founder/owner Scott Cook, "These products speak for themselves in the results they provide. They are high-quality,

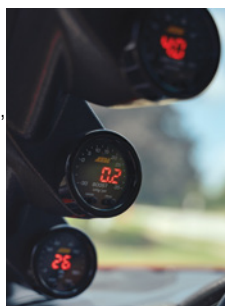
made in the USA products with zero failures and hundreds installed. We have the best inventory management in the business, and every item we sell is currently in stock for immediate shipment. We even ship the same day when you order by 3:00 p.m. EST."

## JON JON MOTORSPORTS

Elgin, Illinois

Jorge Vazquez-owned Jon Jon Motorsports is a multi-faceted automotive business whose primary functions are suspension work, diagnostics, and the swapping and building of engines. The majority of its customers modify their cars for the street, but roughly 20% of them are racers. These competitors road race at tracks such as GingerMan Raceway and the Autobahn Country Club, while the drag racers compete at Great Lakes Dragaway.

Master Technician Jamison Sanchez relates the customers of Jon Jon Motorsports, much like himself with his own personal vehicle, are "really big on trying to build something different," which is a prime reason behind why customers choose its two fastest moving product lines, AEM gauges and Rotiform wheels. Sanchez stated that the customers appreciate the look of the gauges and wheels because they have their own style, setting them apart from other manufacturers. It's also important that they've experienced superior reliability from these products with almost no problems at all in the years the company has been selling them. With all the engine work Jon Jon Motorsports performs, another fast mover is Liqui Moly engine oil, known for its superior lubrication properties.



## SUPER RUPAIR

Rathdrum, Idaho

Super Rupair began in automotive repair/maintenance/aftermarket parts and has

expanded into engine building and fabrication, with about 20% of its customers being racers. With two tracks within an hour of the shop, the racing customer base is primarily local racers competing in hobby stock, modifieds, limited late model, drag racing, and street/street.



The fastest moving products off the Super Rupair shelves are from BG Products, motor oil, and fuel lines/fuel rails. According to Super Rupair owner Tysen Akers, "BG Products manufactures and distributes high-quality, professional-use additives, cleaners, specialty lubricants, and precision tools and equipment. We've seen amazing results with their products."

As engine builders, Akers cited Motul and Schaeffer's motor oils as fast movers due to increased oil performance in high-horsepower applications, turbocharged cleanliness and protection, and shear stability.

Super Rupair has many customers who come in for custom engine builds. The turbochargers and combinations they use from Forced Performance have always exceeded the customer's expectations, he explained.

When working on engines, regardless if they're for street machines or race cars, the shop replaces the fuel lines and fuel rails rather than reusing the old, worn-out ones. Super Rupair uses components from Bosch and Radium Engineering to improve performance and reliability for its customers' engines.

While the staff at Super Rupair are knowledgeable and capable of explaining the advantages of these products to customers, they've found the products often sell themselves due to their quality and performance, so no extra marketing is needed. **PRI**



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# NEWLY APPOINTED

STEVE WARD

While racers quickly recognize the VP Racing Fuels name, the company's new director of marketing will apply 30 years of experience to make sure more people learn about its expanding product line.

By Jim Koscs

**T**he VP Racing Fuels brand is hard to miss in this business. Yet, its product range transcends its name and includes a growing line of lubricants, additives, coolants, non-racing fuels, and appearance products. The San Antonio, Texas-based company recently appointed Steve Ward as director of marketing to ensure racers, as well as more people outside the racing community, get the message.

Ward's previous position as director of marketing for financial services giant H&R Block had him in charge of the vision and strategy for the company's web properties. That was just one of several stops along the way in his 30-year career in marketing, serving a diverse array of clients at major marketing and advertising agencies.

Ward earned his Bachelor of Science degree in Organizational Communications with a minor in Marketing from Missouri State University. He recently shared his goals for marketing at VP Racing Fuels with PRI.

**PRI:** What excites you most about this new role?

**Ward:** The opportunity to work for

and make a positive impact at a company that has such a long, successful history in racing.

**PRI:** Tell us how your experience in strategic marketing, digital marketing, and advertising meshes with VP Racing's goals.

**Ward:** My background in creative development, strategic planning, and online marketing will be a plus as we work to align our messaging across all business units, both domestically and internationally. My experience in "speaking with one voice" across all communications media to multiple markets and channels will ensure marketing consistency as we grow.

**PRI:** Are there specific marketing approaches you bring to the table that you feel had been lacking at VP?

**Ward:** Prior to me, VP Racing had good contributors in this role. I don't think it's been a matter of lacking anything, but I do feel a commitment from our leadership team to allow me to flex a few more marketing muscles. Our marketing team is also nearly all in-house, and in-office, so my years in agency leadership is also a plus when it comes to building a best-in-class marketing team.

**PRI:** What would you say is your top marketing priority for the rest of 2023?

**Ward:** My top priority for the remainder of 2023 is to align marketing strategies across VP Racing's business units. This alignment will allow us to have cohesive messaging, more targeted marketing efforts, and benefit from operational efficiencies.

**PRI:** What role does social media play in your strategic plans for VP Racing Fuels?

**Ward:** We use organic, paid social, and a variety of post types to promote, educate, and sell. VP Racing is involved with nearly all race categories, having an array of product offerings, sponsored athletes, series, retailers, and partners. It's important to showcase the connection VP Racing has between its products and winning, then further promote where followers can find those same products for their own use. It's a testament to the quality and performance of our products that you'll see numerous posts every week about winners using our products.

**PRI:** What is one challenge you see ahead?

**Ward:** A big challenge ahead is prioritization. Our efforts to align marketing strategies across multiple business units will force tough decisions about prioritization. There's a saying, "If everything is important, nothing is important." We'll need to be diligent in making sure we're adhering to our strategies and focusing on those that have the best opportunities to positively move the needle.



STEVE WARD

**TITLE:**

Director of Marketing

**ORGANIZATION:**

VP Racing Fuels

**HOMETOWN:**

San Antonio, Texas

**FAST FACT:**

"When I started my first marketing agency with three friends, despite a strong business plan, all banks we approached refused to extend a line of credit. I mentioned this to our accountant, who had consulted with us on the plan for a year. A few days later, a bank made an offer. I only found out a year later that our accountant and his wife had personally guaranteed the line of credit. When I called to thank them, they only asked that I pass it on to others deserving of a little help. I share that story to thank Roger and Kay Novak for getting me started on this amazing path, and to encourage others to pay it forward."

*"THE HICCUP IN YOUR PLAN ISN'T A FAILURE, IT'S AN OPPORTUNITY TO DO SOMETHING EVEN BETTER."*



**PRI:** What is one recent mistake you've learned from in your professional career?

**Ward:** A recent mistake I made was not communicating clearly and assuming the entity I was dealing with was aligned with my thoughts. The lesson learned was to take the time to review details with whomever I'm working with, having them tell me what they think we've agreed to, writing up those details, and getting approval before proceeding. The pace of business in today's world is quite hectic. It's often hard to make time for this type of process. I promise that, in the long run, it's a time saver.

**PRI:** Who has been most influential to you in your professional career and why?

**Ward:** I've had the good fortune to work or

associate with many very talented individuals. Of those, Mark Heminger [creative director at Harry & David] has had the greatest impact on my professional career. Besides being a dear friend, fraternity brother, and former business partner, Mark has challenged me to push creative boundaries and to never settle for mediocrity.

**PRI:** What is one piece of advice you have received, whether personally or professionally, that has greatly impacted your life?

**Ward:** The advice paraphrased from the Scottish poet, Robert Burns: "The best laid plans of mice and men often go awry." I learned early in my career during my first stint as an agency owner that no matter how

tight you think your plans are, there will nearly always be the need for change. Have a backup plan. Remain flexible. Have an advisor or two to bounce ideas off. Enjoy the detour. The hiccup in your plan isn't a failure, it's an opportunity to do something even better.

**PRI:** Excluding your cellphone/tablet/computer, what's one thing you can't live without?

**Ward:** I'd struggle to live without the support of my family, but after that, I'd say music. A good song can instantly alter my mood or initiate a thought of a time, person, or place that the song is connected to. I'm an Eighties guy, so my favorite is hair bands. I also enjoy classic rock, alternative, blues, classic country, and hip hop when riding around with my daughter. **PRI**



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# INDUSTRY INSIGHTS

ALBERTO LONGO

Alberto Longo was considered a “visionary” just a decade ago when it came to electric formula car racing. In that short period of time, his ABB FIA Formula E World Championship has led the way—along with a variety of manufacturers—in developing not only EV race technology but advancing motorsports technology as a whole.

By Jeff Zurschmeide

There aren't many people who go from a successful career in banking and law to founding and managing a world championship racing series, but that's what Alberto Longo did. After graduating from the Universidad de Sevilla in Spain, Longo worked for Banco Santander and as a partner in his family's law firm. But then his cousin Alejandro Agag approached Longo with a plan to promote FIA Formula 1 racing on Spanish television. The partners were successful in that venture and soon set their sights even higher.

Longo and Agag purchased the Campos Racing GP2 team in the FIA Formula 2 series and changed its name to Barwa Addax. Longo served as team principal and raised money for the effort, winning two team championship titles, and they finished second as a team three more times.

After learning the ropes of an FIA series with a global schedule, Longo and Agag met with FIA president Jean Todt and created the world's first and only all-electric racing series for open wheel formula cars, known as the ABB FIA Formula E World Championship.

*“WITH OUR ULTRA-FAST CHARGER,  
IT CAN CHARGE 10% IN ONLY  
30 SECONDS.”*

Photos courtesy of FIA



The series held its first race in Beijing in 2014. In the first few seasons, each driver had two cars because the batteries would not deliver enough distance for an FIA championship race. The drivers would pit mid-race and change cars. The Formula E series is now on its third vehicle design, and the cars now have plenty of power to finish an hour-long race. Additionally, the series uses innovative strategic elements such as Attack Mode, which gives drivers a little extra power for a limited time. This is similar to “push to pass” and Alternate Red tires used in IndyCar racing.

Formula E has just wrapped up its ninth season, and it's more successful than ever. Automakers such as Nissan, Porsche,

McLaren, Maserati, Jaguar, and Mahindra are involved, with established racing organizations including DS Penske and Avalanche Andretti fielding teams. With races in Europe, India, Africa, South America, Indonesia, and in the United States, Formula E is a growing force in FIA racing. PRI Magazine caught up with Longo in Jakarta, Indonesia, where the 10th and 11th races of the season were held.

**PRI:** You've been with the Formula E championship since the beginning. How has it evolved over the past nine years?

**Longo:** I think technology plays a key role, and the event calendar. Technology is important, and the calendar is so visible. The more big cities that we go to, the perception

***“WE LIKE TO SAY THAT TRACK-GROWN TECHNOLOGY IS WHAT WE DO.”***

of the championship is growing. Those are the two main things we needed in order to see progress.

The technology of the cars is also important because obviously you need to attract manufacturers. We were born with the idea of attracting manufacturers, but at the beginning we had a generation-one car where you needed two cars to win the race. The technology and the range of the batteries clearly wasn't there yet, but we thought that it was important to kick off with this championship as soon as possible. The biggest barrier of penetration for the electric vehicles back then was the range of the battery.

Formula E has just wrapped up its ninth season, and it's more successful than ever. With races in Europe, India, Africa, South America, Indonesia, and in the United States, Formula E is a growing force in FIA racing.



**PRI:** What was the biggest challenge to getting the series going?

**Longo:** Back then, it was showcasing that you can actually do a very exciting and fast race with an electric car. That was a very good idea, but you needed two cars. It was conceptually a little bit of a challenge, but we had a very clear road, and this is what the manufacturers bought into. Having the first manufacturer sign up for Formula E, they bought into the idea that we know we are using two cars now, but you know, in four years we're going to be able to double the capacity of the battery to do the same length of races. Now it's a much faster car, it's a much lighter car, and we use only one car

***"ELECTROMOBILITY IS NOT THE FUTURE OF MOBILITY, IT'S THE PRESENT."***

instead of two.

So you can see the impact of that technology. Then from the second-generation car to the third-generation, we thought that the most important thing was obviously fast charging, in order to mitigate the barrier of the battery. You have two factors, whether you have a bigger battery that can actually last for longer or you can actually charge the battery. Those are the two elements that can make it work.

We were focused on the battery in generation two and on the charging on the generation-three cars. Now our cars are charged by an ABB charger from zero to a hundred in 43 minutes. With our ultra-fast charger, it can charge 10% in only 30 seconds. Technology today is telling us that you can have a charger that can charge your car from 0 to 100% in seven to eight minutes. That's actually the same time it takes for you to refuel your car.

**PRI:** You mentioned manufacturers earlier. Over the years, you've had manufacturers

join and leave the series. How do you provide value to manufacturers so that they want to keep coming back season after season?

**Longo:** Well, we must be doing something good because they keep asking to come back! There is a lot of appetite to be involved in the greater formula, to be part of this family. Obviously, we're the only formula from FIA that promotes electromobility. And we know that electromobility is not the future of mobility, it's the present. You're seeing a lot of different manufacturers that have already announced that by 2025, some of them 2030, and most of them by 2035 are not going to manufacture any more internal combustion cars. They are definitely seeing the value of our platform to promote their new technologies. We like to say that track-grown technology is what we do. They use Formula E as a test bed in order to transfer all that knowledge and experience to the factory. That's the biggest value. We provide return on investment.



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Alberto Longo (far left) was among the dignitaries on the podium celebrating the 100th race of the ABB FIA Formula E World Championship, which took place in August 2022 at the Hana Bank Seoul E-Prix.

**PRI:** How about your audience? How has your fan base grown?

**Longo:** Massively. Our latest number is 381 million in TV viewership last year, which was something like 20% more than the year before. This year is looking really good. We are also growing the live audience, where we had more TV viewers in the past. Now we have a lot more live audience, and that tells you that we have more avid fans than before. People actually put our race on their agenda. I think we are 85% above last year already in the first nine races that we have done.

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**PRI:** How has the Gen Three car changed the series?

**Longo:** The car provides a lot of overtakes. I think it’s over 115 overtakes each race. I always use the example of Monaco because if you think about another FIA championship that goes there as well, they don’t do as many overtakes. They do one or two. We do 110, and that’s how exciting our racing is.

We had 196, I think it was, in Brazil, and 11 changes of leaders. We look more like Moto GP, and that’s absolutely exciting. People are really having a lot of fun watching our races, which is all about entertainment.

**PRI:** Is there a way that non-FIA racing organizations can leverage the technology and the learning that you are developing in Formula E?

**Longo:** Well, that’s a very good question, but it’s more for the manufacturers. The automakers and teams develop the technology for the cars. For the Gen One car, we were the ones doing all the research and development. From Gen Two onwards, the manufacturers are the ones who are

developing the car.

**PRI:** You mentioned very fast charging that is enabled on the Formula E cars. Is that feeding back to the automakers that are sponsoring teams? Are they getting access to that so that they can make their street cars faster charging?

**Longo:** For sure. We are the test ground for them, and I can give you clear examples. Nissan’s motor is actually 180% more efficient than before, because of the development that was done for Formula E on the software. So that’s the value that they get. This is one of the key elements of why we have so many manufacturers: because they invest in the software here, and the end goal of the software is basically to control the power and the energy and make it more and more efficient. The software controls absolutely everything. So the better software you have, the more efficient your car is, and the less battery you use, which puts you in the lead.



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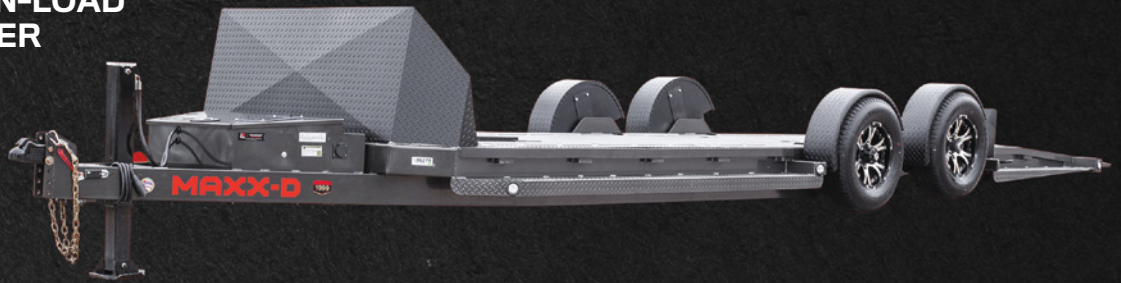


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**PRI:** Formula 1 has announced greater use of the hybrid system for the next year. Will Formula E battery technology or software be used in Formula 1?

**Longo:** No, there is no other championship that we can transfer our technology to. Is that something that we'll be looking into in the future? We need to ask the manufacturers about that, because they own the electric motor and software development.

The audience for Formula E is growing. At the 2023 Gulavit Jakarta E-Prix, "we're expecting to have 60,000 people each day, 120,000 people over the weekend," Alberto Longo said. "That has happened constantly since we launched the Gen Three car."

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**PRI:** Where do you see Formula E in another 10 years?

**Longo:** What do you want me to say there? We obviously want to be the pinnacle. That's the goal, but always with our mission, which is very, very clear. We want to be racing in more cities, we want to have more manufacturers. We are going to be doing more spectacular events. Having a show continuing to grow year on year to become a tier one sport.

Alberto Longo (left) and Dilbagh Gill, CEO and team principal, Mahindra Racing, at the 100th race of the ABB FIA Formula E World Championship. Mahindra is one of a number of automakers participating in the series. The automakers "are definitely seeing the value of our platform to promote their new technologies," Longo said.

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**PRI:** I notice that Formula E drivers tend to be very young. Do you have a younger group of drivers than Formula 1?

**Longo:** Definitely, we are something like 11 years younger on the driver's side, it's true. We have a mix, you know, because we have a lot of drivers who are experienced, and who have been in the championship from day one, so now they're 10 years older. Definitely there are new people coming into the championship. We had the Formula 2 champion with an offer to go to Formula 1, but he decided to come to Formula E. That was a really good thing. It's pride for us to have those drivers come into Formula E instead of going the traditional route.

**PRI:** Electric vehicles can be hard to sell in America. What is your message to all the people who are in the racing business in America? Not the drivers or fans, but the people who are building cars and making tires and everything else. How can they participate or leverage what you're doing in their own business?

**Longo:** I think that the most important thing, first of all, is to state where we are today. Where we are today is a world which is going electric already. The reality is that we have the experience of getting all those manufacturers, all those different suppliers, and all the challenges that we have faced because the technology was totally nonexistent. We built all this from scratch. People would say that we were totally crazy doing a full electric championship, because the batteries would never cope with the temperature. It was challenging, obviously, but we got there. When we started this, people used to call us visionaries, but today it's a fact.

So for all these industries related to motorsport, what I tell them is, we slowly need to start swapping into electric. With something like tires, you can change manufacturers or compounds, but it's all pretty much the same. But there are all these other components, like the software or the powertrain or the battery where the technology is still, I would

say, at about 5% to 10% of what's going to be coming in the next five to 10 years. If someone would have told me when we started this that we were going to have a charging capacity of 600 kilowatts or battery power output of 800 kilowatts, I would have said that they were crazy. It's only eight years later that we're producing that.

Now that's going to the mass market. So what's going to come in the next three or four years? Because this is exponential, you're going to be seeing cars that have a range of 1200 kilometers (750 miles). And you'll be capable of charging your car in three or four minutes. That will totally change mobility in the world.

Then, motorsport is driven by manufacturers, and manufacturers are not going to have an economic interest in combustion. Like it or not, it's going to happen. I don't know if it's going to be seven years, 10 years, 15 years, whatever. But really, we are in the right spot. **PRI**

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Bravo Trailers LLC  
Brembo  
Brian Tooley Racing  
Briggs & Stratton Racing Engines  
Bradix Inc  
Browell Belthousing Inc  
Brown & Miller Racing Solutions  
Buckeye Carbide  
Buffalo Turbine  
Bullet Racing Cams  
Bully Dog - SCT Performance  
Burnyzz  
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Burromax  
ButterBuilt Professional Seal Systems  
Buzze Racing - Buzze Axles  
C&S Specialties Inc  
Calico Coatings  
Callies Performance Products - Energy Manufacturing  
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Canton Racing Products  
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Capitol Custom Trailers and Coaches  
Cardinal Parts and Equipment  
Centerforce Clutches a Division of Midway Industries  
Centroid Performance Racing  
Champ Pans  
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ChassisSim  
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Circle D Specialties  
CIRCO Brakes  
ClampTite Tools  
Clarendon Specialty Fasteners Inc  
Clark Copper Head Gaskets Inc  
Classy Ulla  
Clay Smith Cams  
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Clinton Aluminum  
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Coan Engineering  
Cobb Tuning  
Cobra - Detroit Torch  
Coker Tire Company  
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CTECH Manufacturing  
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CTW Automation  
Cunningham Precision  
Curto-Ligonier Foundries Co  
Custom Performance Engineering  
CVF Racing  
CWT Industries LLC  
Cylinder Head Abrasives  
D&J Precision Machine  
D.O.A. Dragsleds  
D3 Performance  
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Dailey Engineering  
Dakota Ultrasonics  
Dan Olson Racing Products  
Darana Performance  
Dart Machinery  
DARTON Sleeves  
Davis Technologies LLC  
Dayco Products Inc  
DayStar Machine & Cycle Concepts  
Dayton Laminas - DAYtube  
Dayton Rogers Mig Co  
DeatschWerks  
Decal Shop - Racer Walsh Co  
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Defiant Metal  
Delta Custom Tools  
Delta PAG  
Deralte Performance  
Design Engineering Inc  
Diamond Racing Products  
DIESEL Motorsports  
DieselCore  
Digital Racing Cards LLC  
Dino-Lite Scopes  
Dirt Empire Magazine  
DMI Racing Components - Bulldog Quick Change Rears  
DMP Awnings LLC  
DMPE Inc  
Dodson Motorsport  
Domyne Gears  
Double "O" Green  
Drag Illustrated Media  
Drag-N-Drive Addition  
DRC Race Products  
Drexler Motorsport USA  
Driven Racing Oil  
DRP Performance Products  
DSCsport  
DSS Racing Pistons  
DTS Drivetrain Specialists  
Duco Performance  
Dura-Bond  
Dyer's Top Rods LLC  
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Dynabrade Inc  
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EDRO Engineering & Specialty Steels LLC  
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Eide Industries Inc - RaceCanopies.com  
Eldorado Trailer Sales  
Electric Drag Racing Association  
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Elgin Industries  
Eliminator Products  
Elite Tuned School  
Elliot's Custom Trailers and Carts  
Ellwood City Forge  
EMJ  
E-Motive Online  
Emtron Australia Pty Ltd  
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Engine Ice - Kost USA  
Engine Pro  
EngineQuest LLC  
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EPARTADE  
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Eqwos  
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EXEDY Globalparts  
Exergy Performance  
Exhaust Gas Technologies Inc  
EZSipe  
Factory Kahne  
FANUC America Corporation  
Farris Equipment Sales  
FAS Diesel Fuel Systems  
FAST Cooling - Fresh Air Systems Technologies  
Featherlite Trailers  
Federal New Power - FI performance  
Ferrea Racing Components  
Fidanza Performance  
Fifth Third Bank Motorsports Group  
FIREBOTTLE  
FIRMAN Power Equipment  
Fitel Fuel Injection  
Five Star Bodies  
FK Rod Ends  
Flagtronics by Ballenger Motorsports  
Flaming River Industries Inc  
Flatout Gaskets and Fabrication  
Flatrock Motorsports Park  
Fleece Performance Engineering  
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Flitz International Ltd  
Fluid Film  
Fluidmamp - Buffalo Turbine  
FluidLogic  
FLUIDVINE High Performance  
Flying A Motorsports Inc  
Foggit  
Ford Performance Parts  
Foredom Electric  
Forgeline Motorsports  
Formula Trailers by Novae LLC  
Fortin Racing Inc  
Fragola Performance Systems - FK Rod Ends  
Frankenstein Engine Dynamics LLC  
FTI Performance  
FTI Performance - McLeod Racing - Silver Sport Transmissions  
Fuel Factory  
Fuel Injector Clinic  
FUELAB Fuel Systems  
FuelTech ECU  
Full Spectrum Power  
FURICK CUPS  
Gale Force Suspension & Tool  
Gandrud Performance Parts  
Garage Guys  
Garmin USA Inc  
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Goodyear Racing - Mickey Thompson Race Tire  
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Gusher Pumps - A Ruthman Company  
GZERO Additive  
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Harrop Engineering USA  
Hart's Turbo  
Hastings Piston Rings  
Haulmark Racing Trailers  
Hawk Performance  
Headershield  
Heatshield Products Inc  
Hedman Performance Group  
HEM Inc - H&M SAW Inc  
Heritage-Crystal Clean  
HKS  
HMS Motorsport  
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Hollinger America  
Honda Inc  
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Howards Cams  
Howe Racing Enterprises  
HP Tuners  
HPL Oil - HPT Turbo - AFIS Injectors  
HRP - Hepfner Racing Products - Streeter Super Stands  
Hughes Performance  
Hunter Engineering Company  
Hussey Performance  
Huth Ben Pearson International  
HyLift Johnson Lifters by Topline Automotive  
Hypercraft  
ICI Metals  
IDIOT  
Ignite Racing Fuel  
IMCA  
Impact RaceGear  
Impact Racing Inc  
Improved Racing  
Indianapolis Motor Speedway Museum  
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Inferno USA Eyewear  
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Liberty's Gears  
Lifetime Fire and Safety Systems  
Lincoln Electric Company  
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LIQUI MOLY	Offroad Anonymous	RacingJunk.com	Sonnax	TotalSim US
Lisle Corporation	Offroad Motorsports Youth Foundation	Racingrivets.com	SoundGear	Toy's Tire U.S.A. Corp
Litemax Batteries	Ohio Brush Works	Radical Race Gear	South Bend Clutch	Track Systems North America
Livernois Motorsports & Engineering LLC	Ohio Crankshaft	Radium Engineering	Southern Adrenaline	Trackside Systems
Lizard Lit Pit Lights	Omni Powertrain Technologies	Randy's Racing Filters	Southern Drag Boat Association	Tractive Suspension
LOCK-N-STITCH Inc	Online Resources Inc	Raybestos Powertrain	SP Tools USA	Trailer Alarms
Lokithor	OpenFender	Rayfast USA	SPA Performance USA	Trans-Go
Long Tube Headers	Optic Armor Performance	RC Components	SPA Technique Inc	Transmission Specialties
Longhorn Fab Shop	OPTIMA Batteries	RC Trailers	SPAL USA	Trend Performance
Lotse Steering Wheels	OptiMate High Performance Battery Chargers	RCI-Racer's Choice Inc	Specialty Auto Parts - Proform	Tresor - 3FP
LSM Racing Products - Logan Smith Machine Co Inc	OptiTorque Technologies	RCV Performance	SPEED SPORT	Trick Titanium
Lubelocker	OTR Filters	RECARO Automotive	Speedbear Fasteners	Trickflow
MSM Competition Engines	Out There Brands	Red Camel Racing	Speedmaster	Trick-Tools
M.O.M.S. Place	Outerwears Inc	Red Line Synthetic Oil	Speedtek Transmission Components	TRIUMPF
M1 Concourse	Outlaw Diesel Super Series	Red Wood Enterprise Co Ltd	SpeedTour	Tsugami America
Mac's Custom Tiedowns	P1 Manufacturing	Redhorse Performance	Speedway Illustrated	Tube Works RaceLine Products
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Magnafuel Products Inc	Painless Performance	Redwood Rally - Motorfab	SpringRithm by 84 Unlimited	TurboLamik
Magnus Motorsports	Palmgren	Regis Manufacturing	SpringTools	Turbosmart
Magnuson Superchargers	Patterson Enterprise	Reich Tool & Design - Orr CNC	SRI - Stock Car Steel and Aluminum	Turbostart Batteries
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Mainline Dyno	PDRA - Professional Drag Racers Association	Reid Racing Inc	Stainless Headers Mig Inc	Turn One Steering
Manley Performance	PE Racing	Reid Rockersarms	Stainless Works	Turnkey Trailers
Mantic Clutch USA	peel 3d	REM Surface Engineering	Stanadyne	TW Metals
Manton Pushrods - Manton Rockersarms	PennGrade 1	Remflex Exhaust Gaskets	Stand 21 North America	UCoat It
Maradyne High Performance Fans	Penske Racing Shocks	Remegade Performance Fuels & Lubricants	Star CNC Machine Tool Corp	Ultimate Awning
Martin Generators	Performance CBN	Resolute Precision Manufacturing	Star Racer Belts	Ultimate Headers
Marwin Sports	Performance Data Systems	Retrofit USA LLC	Steering Buddy	Ultra Shield Race Products
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Masters Entertainment Group Inc	Performance Engineering & Manufacturing LLC	Rhino Tuff Tanks	Stilo	Uni Saf
MAVTV	Performance Plus Global Logistics	Richmond - Motive Gear	Storm Striker Art by Justin Patten	UniSteer
Max Track Time	Performance Plus The Leading Edge	Ricky Sanders Racing	Strange Engineering - Strange Oval	United Engine & Machine
Maxforce Diesel Engine Parts	Performance Tube Bending	RJ Race Cars - Quarter-Max	Strapworks Automotive	United Race Parts
Maxima Racing Oils	Peterson Fluid Systems - Specialty Products Company	RMC Engine Rebuilding Equipment Inc	Stratus Auto Equipment	United States Auto Club
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ME Racing Service AB	Platinum Racing Products	Rod End Supply	Sunnen	Van-K Wheels
MEC CNC Machines	Plymouth Tube Co	Rogers Dabbs Performance Parts	Sunoco Race Fuels	Vanson Leathers Inc
MEGA-Line RACING ELECTRONIC	PMAS Technologies	Roltek Transmissions	Sunoco Racing Oils	VBOX Motorsport
Mel Hamblen Racing	PML Inc	Ross Racing Pistons	Sunshine Metals	Velocita USA
Melett	Podium 1 Racing	Rottler Manufacturing	Supercharger Systems Inc	Verge Quick Outlaw Series
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Metalloid 1 Legacy Autosport	Poppe-Patthoff	RPM Trailer Sales	Superior Bearing & Supply	Victory 1
Meyer Distributing	POR-15 - American Icon	RT Sales	Supertech	Victory Custom Trailers
Meziere Enterprises	Portatree Timing Systems Inc	RWNO.co	Surf & Turf Instant Shelters Inc	Viking Performance Inc
MGP Connecting Rods	Power Automedia	S&S Diesel Motorsport	Swain Tech Coatings Inc	Vision Wheel
Micro-Armor Lubricants	Powerbuilt Tools	Sabell	Sweet Manufacturing	VMP Performance
Mile High Crankshafts Inc	Powerhouse Racing	SADEV Racing Transmissions	Swift Filters Inc	VP Racing
Milestone Marketing	Powermaster Performance	Safecart Inc	Swift Springs USA Inc	Hyper Industrial
Millennium Technologies	PowerMist Racing LLC	Safety-Kleen	System1 Filtration	WABAM
Miller Electric Manufacturing LLC	PRC - Precision Racing Components LLC	Saldana Racing Products	T&D Machine Products	Wagner Competition Products
Millner-Haufen Tool Co	Precision Products Performance Center	Samsonas Motorsport	T&D Tunstgen Products Manufacturing Inc	Wagner Tuning Inc
Milodon	Precision Turbo & Engine - Turbonetics	Sander Engineering	T&E Ent Auto Haulers	Walker Performance Filtration
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MME Motorsport	Pro Eagle LLC	SBI	Tackform	Wavetrac Differentials
Moduline Cabinets	Pro Spot International	SCE Gaskets - Athena-SCE	Taiwan Racing Products Co Ltd	Weddle Industries
Molecule	Pro Ultrasonics	Schaeffer's Specialized Lubricants	Talladega Gran Prix Raceway	Wegner Automotive
Molnar Technologies LLC	ProCharger Supercharger Systems	Scheid Diesel	Taylor Motorsports Products	Whehri Custom Fabrication - WCfab
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Moroso Performance Products	Pro-Filter Performance Products	Schultz Racing Fuel Cells	TEAMTECH Inc	Westhold Corporation
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MPD Racing - Ti22 Performance	PTP Turbo Blankets	SEMA Data	The ArkMkIleen Company	Williams Engineering LLC
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MR RACE OIL	Pure Drivetrain Solutions	Serck Motorsport	The DriveShaft Shop	Winwood Disc Brakes
Mullins Race Engines	PureForge	SERDI Corp	The FOD Control Corporation	Winnebago
Mustang Dynamometer	PWR Advanced Cooling Technology	Service Precision Grinding Inc	The Joie of Seating	Winona Van Norman
MY WER	Pyrotext	Service Steel Aerospace	The Mental Agility Coaching Center	Winters Trailer Sales LLC
MYLAPS Sports Timing	QAI	SHAWV USA	The Original Sidelite	Wirecare.com
MyRacePass	Qingdao Lakeside Tyre Co Ltd	Shepherd Insurance	THE SHOP Magazine	Wiseco
Nankang Motorsport Tire	OMP Racing	SHIELDS Windshields	The Tuning School	WISSOTA Promoters Association
NASCAR - ARCA	OTP Quick Time Performance	Shirt Works Racewear	Thermo Tec Automotive Inc	Wizard Cooling Performance Radiators
National Auto Sport Association	QuaCast LLC	Shocker Hitch	THG Automation LLC	Woodward-Fab
National Sprint Car Hall of Fame & Museum	Quantum Machinery Group	Shop Crane by Gorbelt	Thitek	Wooll Aircraft Products Inc
National Tractor Pulling Championships	Quda Auto Parts	Shopmonkey	Ti Automotive - Walbro	World Products
NORL	Quick Performance	ShopSABRE - Langmuir Systems	Ti22 Performance	World Racing Group
Neal Chance Racing	QuickCar	Sikky Manufacturing	Ticon Industries Inc	Worldwide Bearings
NecksGen	R&M Race Trailers	Silver Seal Products	Tierra Tech USA Inc	Wossner Pistons
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Neway Manufacturing	Race Parts Liquidators - Drop The Hammer Auctions LLC	SimGear Motion Simulators	TILTON	XDP
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NHRA	Race Star Industries	SIRUDA Performance Gaskets	Titus Performance Products	Xtrac
Nickels Performance Distributors	RACE TECH Magazine	SIS Motorsports	TiN Engineering	Xtreme-Di
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Nitrous Express - Snow Performance	RaceCals	Smedley Diesel LLC	Top Street Performance	YourDyno.com
Nitrous Outlet	Racecar Engineering Magazine	Smith Brothers Pushrods	TOPDON USA Inc	Zamp
Noonan Race Engineering	RACEceiver - Flagler	Smith Systems Inc	Toro Tents Banners and Displays Corp	Zetronix
Northern Radiator	Racers For Christ		Torqued Distribution	ZF Race Engineering North America
Nostrum High Performance Inc	Racetech USA		Total Power	zMAX
NPW Companies	Racetronics		Total Seal Piston Rings	ZyCoat High Performance Coatings

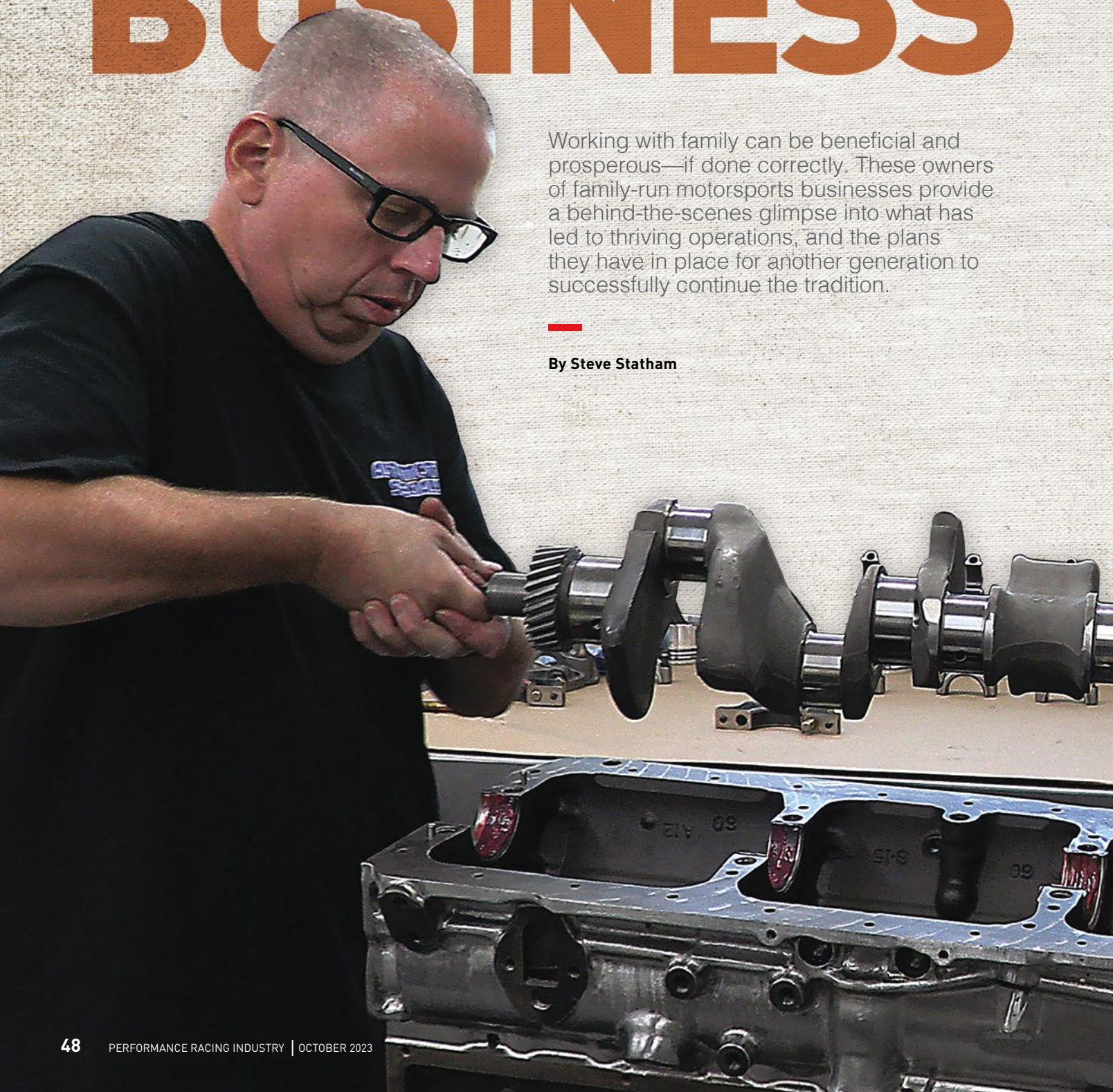


# FAMILY BUSINESS

Working with family can be beneficial and prosperous—if done correctly. These owners of family-run motorsports businesses provide a behind-the-scenes glimpse into what has led to thriving operations, and the plans they have in place for another generation to successfully continue the tradition.

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By Steve Statham





**F**or a good many people, the thought of operating a family business is a dream job. To be surrounded by loved ones, all working toward a common goal, not having to answer to remote bosses who may not have the family's best interests in mind, has the feel of an ideal occupation.

It is true that with a family business, the good parts can be very good. It is also true that family dynamics can be tricky to navigate, bringing their own unique complications to running a business.

The motorsports industry seems especially fertile ground for family businesses, as many young gearheads and their families start out chasing dreams of racing success, only to discover along the way that engine building, chassis fabrication, or selling parts is their true calling.

Several of the sources we spoke with for this article followed that very pattern. These long-time family-run operations have seen the good side and the harder side but have managed to work their way through to success.

Brandon Maxwell and his father Gary have run 45 Race Shop in Milan, Tennessee, for many years. "My dad started an auto salvage business in 1971. I came along shortly thereafter," Brandon said. "As a teenager I started racing, and we started horse-trading race car parts on the side to offset what I was doing. By the mid-1990s it had turned into a full-fledged business. I went off to college, and when I came back, I said to Dad, 'You keep going with the salvage yard, and I'm going to push the race car stuff.' We ran it all out of the same location, because a lot of our salvage customers were racing people."

They operated both businesses for several years, until selling the salvage yard nearly 10 years ago. "My dad was getting older, and I was getting wiser, I guess, and decided that wasn't the route I wanted to pursue the rest of my life."

At Automotive Specialists in Concord, North Carolina, Keith Dorton has been building racing engines first with his brother and now with his son Jeff. "It's a lot of fun, but it can bring you to your knees, too," Dorton said. "We



Jeff and Keith Dorton of Automotive Specialists. Photo courtesy of Jeff Huneycutt/The Horsepower Monster



started in 1965. It was just me at that time as far as the family, as that was the same year I got married. My wife had to keep a regular job to support my addiction for working on engines until we got established.

"As things got bigger, she helped with the books and things," he continued. "But the first real family member to work with me was my brother Randy, who was 10 years younger. He started when he was just a toddler almost. He worked with me until he went to technical school for two years, and then a year after that he went out on his own, drag racing. Which I totally agreed to have him do his own thing."

Randy went on to great motorsports success, rising to director of engine operations at Hendrick Motorsports, before tragically losing his life in the 2004 airplane crash that saw 10 members of the Hendrick family and NASCAR race team killed. "Randy was a smart guy, a good engine guy, and a good businessman. He ran the engine



Barry Wright Race Cars has been in business since 1977, and Wright's wife, and later their children, have been working with him, above, since the very beginning.

shop for Mr. Hendrick until the plane crash," Dorton said.

"Then my son followed in the same way. Jeff just turned 55. He took an interest and

started helping in the shop when he was a toddler also, and that's all he's ever done. I don't know how we've managed to stay pretty tight. We kind of separate our family social part of it from the business. We try not to talk about the business so much when we're having Thanksgiving dinner or we're at the beach."

Blake Robertson has worked with his father Brock at sprint car specialists BR Motorsports in Visalia, California, until Brock's recent retirement. "We started in 1993, so we just celebrated 30 years on March 1," Blake said. "I was a senior in high school, and my dad had a wheel and tire shop company. We raced and came up through quarter midgets, micro sprints, and mini-sprints, and we had a sprint car. We had some friends who were in the industry, and we got some support from some manufacturers."

As a racer with connections, he would get requests from other locals for parts, so

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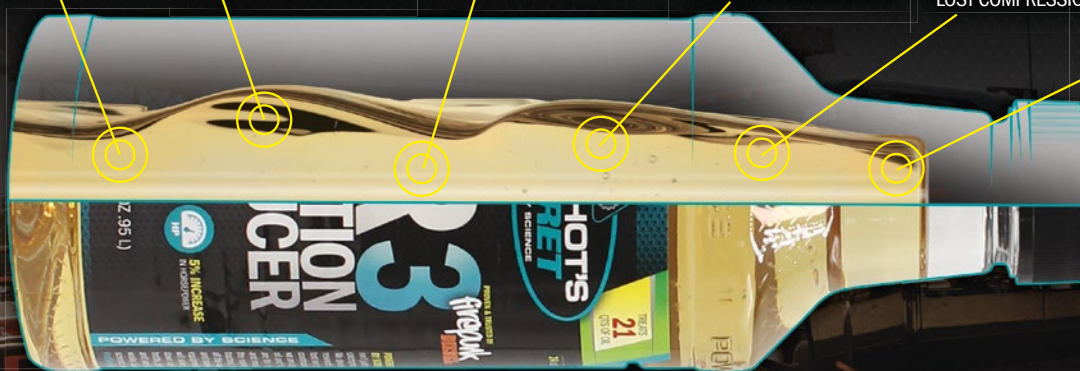
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when ordering for himself, he would tag on some additional parts for other racers. "It was actually on a trip to PRI in 1992 when my dad and I decided on the flight home. He said he would really like to get into a business like that."

Blake had his eyes on being a World of Outlaws sprint car driver, but financially it wasn't viable, and being located far from the sport's Midwestern stomping ground made it tougher. "So we started this little company, and the rest is history. It's just kind of grown and evolved over the 30 years. My dad just retired in 2020. It's been a thrill ride, that's for sure."

Bud Kaeding is the third generation to work at Kaeding Performance in Campbell, California, and works alongside his dad Brent. "The shop itself started with my grandfather and his brother; they started building lawn furniture back in the 1950s and '60s. They started building wheels, and that turned into engine work. We were a machine



45 Race Shop grew out of Gary Maxwell's auto salvage business. His son Brandon decided to "push the race car stuff" when he graduated from college.

shop for years," Bud said. "About 1986 my dad started the retail side for sprint car racing. From then on it has blossomed from a hobby shop—that's kind of what sprint car racing was at the time. It wasn't quite the industry it is today. There weren't so many specialty manufacturers in sprint car racing at the time. It was one-off parts where you had to modify everything to fit your car."

"My dad and Brian Matherly really run the shop now," he continued. "My dad's

here pretty much every day, but Brian pretty much runs the show. My dad's 63 now, and since he's kind of retired from racing, he's found other things in life that excite him. He's built himself a second hot rod and has been hitting up car shows here lately."

Barry Wright Race Cars in Cowpens, South Carolina, has been a family business from the beginning. "I've been in business since 1977," Barry said. "My wife Judy—she's wanting retirement—she's been with



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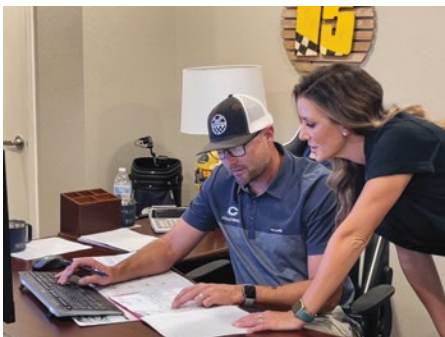


me the whole time. And I've got my daughter Ashley and my son Lance working here."

## ALL TOGETHER

Reality TV has presented many warped versions of family-run businesses in recent years. Even though few of our sources could relate to the wrench-throwing antics at Orange County Choppers, nearly all of them mentioned the American Chopper TV show unprompted.

"There are definitely some pros and cons (to a family business)," Robertson said. "The pro is, you're getting to work with your family. There's nothing better than having your dad there, who's someone you look up to, your hero—that's the way I looked at it—and always want to learn from him, and he could do no wrong. The cons are, tensions do get high. When things go tough, there are definitely some fireworks that go off every now and then. We had our fair share of those. I think back to the American Chopper



It was on a trip home from the 1992 PRI Show that Blake Robertson, seen here with his wife Kasey, decided to open BR Motorsports with his father Brock. The elder Robertson retired in 2020, and Blake has taken over the business.

show that was on Discovery. And I was thinking, 'They should have done a story on BR Motorsports. Dad, we could have retired by now if they'd have spent a month here.

They'd have been like, 'Holy cow, these people are nuts.'"

For others, that reality TV vision of a family business was more of an eye-opening cautionary tale. "That TV show that was on a few years ago with those motorcycle fellas, the guys that cussed and threwed and kicked each other, I thought, 'God has really blessed me that we can get along, working, and seeing each other every day sometimes,'" Dorton said.

Our sources were unanimous in believing that the best part of a family race shop was the closeness between family members through every stage of life. "I guess the best part is, how many people who are 50 years old get to see their dad six days a week? I've worked with my dad since I got out of college in the mid-1990s," Maxwell said. "I've only quit a couple times, and that lasts for a couple hours. I would quit and go home and eat a sandwich, and come back, one of those kinds of deals.

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"Over time it's been really good," he added. "We've got to watch each other grow as people, and he's got to watch me grow up from a kid to a young adult to having a family of my own. We get to see each other and communicate every day. The plus is just that. I get to spend a lot of time with my dad that I probably wouldn't if I had a different job or career. And we take family very seriously in my house. Family is my priority, and then everything else. My kids, when they were little, would come and go every single day and get to see their grandparents. To me that was important."

"What I like about it the best is being able to see my family," Dorton related. "I see all these people, long-time friends and acquaintances, their kids and grandkids are 2,000 miles away and only get to see them once or twice a year, or maybe not even that much. It makes me realize how blessed my wife and I are."

"For instance, when our first grandchild



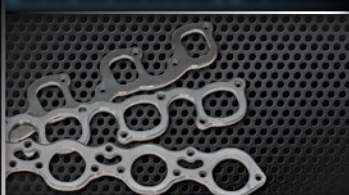
There are many advantages to working with family, said Barry Wright's wife, Judy. "We can trust each other," she said of her children, Ashley, above, and Lance. "It's good to know it's just us, taking care of business."

was born—and she'll soon be 20—our daughter was full-time in our office. She was a flight attendant until she got pregnant, and we needed somebody, so we talked her into

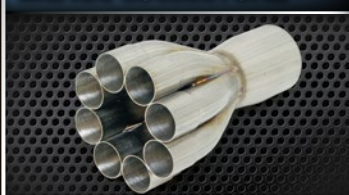
coming on full-time here. We took one of our offices that wasn't used that much and converted it into a nursery. So I got to see my now-almost-20-year-old granddaughter daily and help take care of her. When our son Jeff, they had their first child—and she just turned 15—it was the same way. After they got to be five or six years old, we turned that office into a playroom for them."

That appreciation for seeing family regularly runs from both ends of the age scale. "My grandfather is fixing to turn 91 in August, and he just lives a couple blocks away and comes by the shop a couple days a week," Kaeding said. "He's pretty involved in the properties and staying on us to keep stuff up around here. I'd say the pros of it are just being around your family, and having your family involved in the day-to-day is just pretty special and cool to me. Not a lot of people I know have the relationships with their dads that I do, and I think a lot of that is attributed to just being involved with the

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business and being here working daily."

Besides the satisfaction of working alongside family members, there are other advantages to family businesses that aren't always obvious. "We can trust each other," Judy Wright said. "Some companies have to worry about people messing with your stuff or messing with your books. We don't have to worry about that. It makes it really good to know it's just us taking care of business."

Family support at work also provides flexibility that is especially important when hard times hit. After Maxwell received some bad medical news, his family was there to cover for him at the shop until he was back on his feet.

"If I'd had a job working for somebody or somewhere else, it might have been a bit of a challenge," he said. "But we talked about it, and what the doctor said was, 'What you've got is curable, it's just going to take some time.' And the first thing he asked was, 'How flexible is your work schedule?' I told

him, 'As flexible as it needs to be.'

"I had to go to treatment five days a week for seven weeks," Maxwell continued. "So I wasn't able to work. And then for the next two-and-a-half months I wasn't able to work because of the side-effects of the radiation and chemotherapy. Just in the last six weeks I've started back to work every day, but about three days a week I still have to go to therapy or a doctor's appointment. So my dad has stepped up and stepped in, and we've never missed a beat. If I worked for someone else, it probably wouldn't have been as easy of a transition as we've gone through with this."

## SUCCESSION AND OWNERSHIP

Family or no, business being business, at some point any small race shop will have to address ownership shares and succession for the next generation. For some, those topics stay quietly in the background, but it's

best for all concerned if a plan is put in place before it is too late.

"There was a succession plan, definitely. I think that's something that's probably overlooked by more family companies than anything," Robertson said. "Or any company at all. The owner needs to have some type of succession plan, have somebody that they're going to be able to groom to take this thing over, or buy them out, or assume the responsibilities. That is something that we had talked about."

"That's something that we're going through right now," Dorton said. "I don't have any plans of retiring, but one day after church, my wife and I talked about updating our wills. And so we did. I've been president of the company since it started, and when Jeff got of age, he became vice president. But we don't want to wait until I'm not here or no longer able to make decisions to give him what he rightfully deserves, and that's to be in charge. He thinks he's in charge now

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anyway, but that's okay."

Maxwell said his father was always very business-minded and put together a succession plan early. "As I got older, that plan was still in place, but the constraints got a little more unlimited when he saw that I was going to make it and that I was going to be able to handle it and the working was going to be okay," he said.

"The succession then started being, 'Well, do you want to buy this place from me? Do you want me to give this place to you when I pass? Do you want to buy part of it?' We talked through all that, and so we've had a succession plan in place for a long time for me. With that said, I have a succession plan in place for my children the same way he did. It's got some limitations on it, some age constraints—at this age you can do this, at this age you can do that—and they are about to reach those milestones. But to be honest, I don't think either one of my kids will ever do what we're doing," Maxwell added.



Jeff Dorton, left, has been around Automotive Specialists since he was a toddler, "and that's all he's ever done," said his father, Keith, right. "God has really blessed me that we can get along, working, and seeing each other every day." Photo courtesy of Jeff Huneycutt/The Horsepower Monster.

### FAMILY ADVICE

That is another challenge that family businesses must deal with: It may be easy to have two generations working in a race shop, but there are no guarantees that future generations will want the same career path. To avoid potential problems that might

discourage the next generation, our sources had solid advice for maintaining a successful family race shop.

"I don't think you should force a family member, or try to persuade them so much," Dorton said. "I think you should just lay out, 'Here's the opportunity, here's what you

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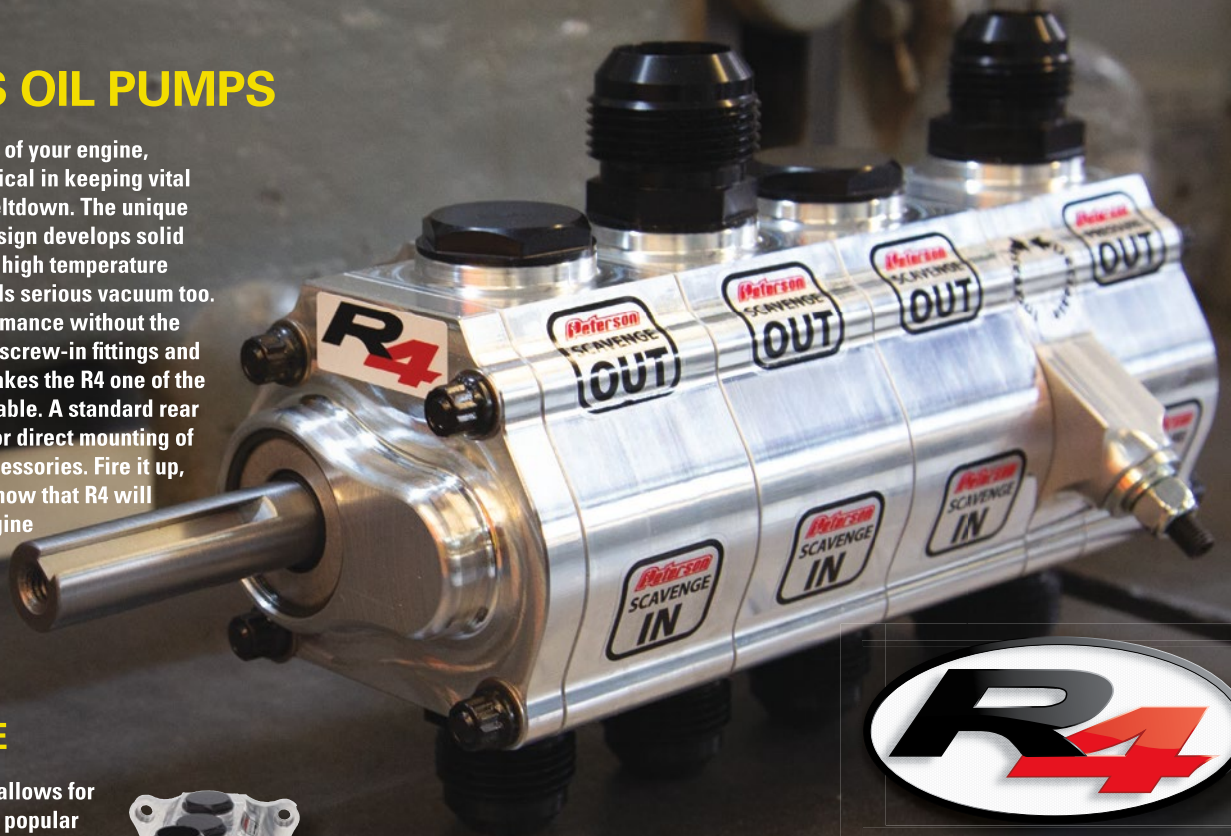


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can do if you want to,' and let them make that decision, whether it's a son, daughter, brother, whatever."

"My biggest advice would be from two different aspects. The first is, communication is 100% the key," Maxwell said. "We figured out a long time ago that communication is the biggest thing. Whether I want to hear it, or he wants to hear it or not, if you get it out in the open and talk about it, there's never any shock. The repercussions are so much less if everybody knows what's going on than if you have a big surprise or an 'uh-oh.'"

"The other thing is not to get greedy. If there's a dollar laying on the table and half of it is his and half of it is yours, that's the way it needs to be. It doesn't need to be, 'Well, today I really need 70 cents of that, and you need 30 cents of that.' Don't let greed interfere with your relationship."

"And greed can be with time and everything else," Maxwell continued. "'Hey, I'm going to be off today.' 'Well, if you're off

today, I'm going to be off tomorrow.' Don't play that game that way. Because you never know when you're going to be diagnosed with throat cancer and be off for four months instead of a week for a vacation."

Not letting work overwhelm every aspect of family life may be the biggest factor in operating a successful family race shop. "The biggest thing is separating business from life," Kaeding said. "Being able to separate that is tough. It's obviously hard work with any business you're in. Just work hard and stay dedicated. I think that if you can do those couple things, you can see through any problems that might come across with anybody in your family as far as bumps in the road through the journey."

The nature of motorsports will likely make it friendly ground for family-run businesses for some time to come. "I think motorsports is a great way to bring family together, remembering that motorsports can be dangerous," Dorton said. "There's

nothing better than watching a family member win a race, whether it be because he was driving, or he built that engine, just being a part of that winning effort is very gratifying." **PRI**

## SOURCES

### 45 Race Shop

45raceshop.com

### Automotive Specialists

automotivespecialists.com

### Barry Wright Race Cars

barrywright.com

### BR Motorsports

brmotorsports.com

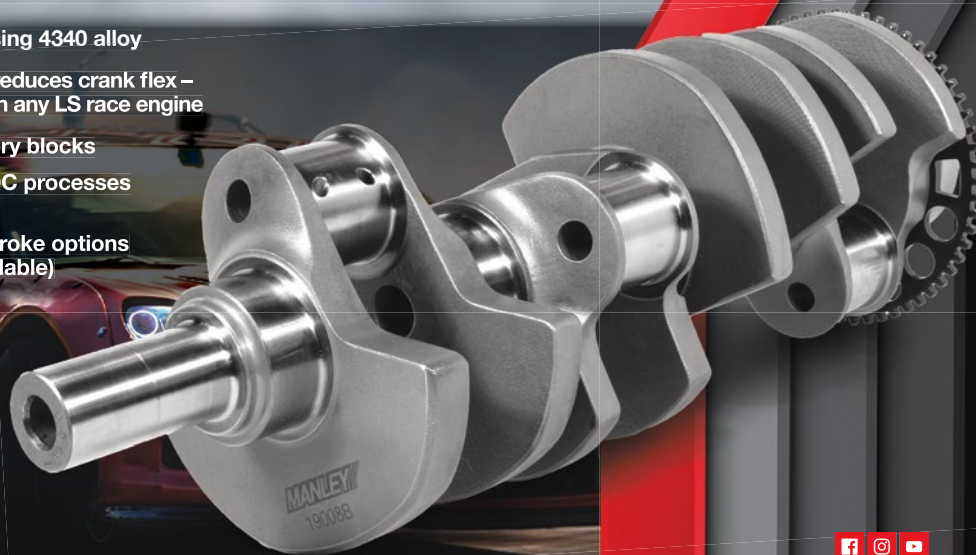
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**PRI SHOW**

# SHOWTIME: WHAT'S NEW AT THE 2023 PRI SHOW

It's just about showtime. Here is a summary of the new features at this year's PRI Show in Indianapolis—including the return of live racing action—plus details about popular Show activations.

By Jack Haworth



It's time to get ready for the fastest and loudest family reunion on the planet when the motorsports industry unites in downtown Indianapolis on December 7–9 for the 35th edition of the PRI Show.

Featuring more than 1,000 exhibitors and some 3,000 booths spread across more than 750,000 square feet in the Indiana Convention Center and Lucas Oil Stadium, this unrivaled event unites professionals from every racing discipline in one city.

The most influential business event in racing, the 2023 PRI Show will feature the newest parts and technology, access to countless manufacturers and service providers, and virtually unlimited opportunities to network face-to-face with industry leaders. If you're in the business of racing, the 2023 PRI Show is a must-attend event.

"The PRI Show actually feels like a reunion, because it is the one time each year that everyone in our industry meets up to conduct business," said Karin Davidson, PRI Show Director. "It's that little niche of time after the previous race season ends but before pre-season testing begins, when everyone goes to PRI to see what's new and upcoming and find out what they need for the next season."

Among the Show's aisles of innovative products, tools, machinery, and gear, buyers will also find 100 first-time exhibitors showcasing a bevy of never-before-seen offerings, from transmissions to motor oils, parts washers, stud kits, race seats, engine stands, and much more.

In addition to the many new exhibitors, there will also be several new exhibits at this year's Show. Most notably, we are thrilled to announce the return of live racing action to the PRI Show, part of several new activations inside Lucas Oil Stadium set to include a showcase on the growing influence of alternative racing platforms, as well as a curated selection of race cars at the Goodyear/Mickey Thompson Experience.

"Lucas Oil Stadium is not just an extension of the PRI Show, it is a 'must-see' area of the Show," said Jim Liaw, General Manager of PRI.

Back at the Indiana Convention Center, attendees can check out fascinating interviews at the PRI Podcast studio, a dedicated stage for motorsports influencers and media personalities to host live podcasts featuring various special guests. It's an extension of our reimagined PRI Paddock, where members can go for all Show-related questions, giveaways, and more. For those not near the PRI Paddock—located in the Yellow Lobby, next to the hanging race car—the 2023 PRI Show App will serve as their virtual guide to the Show.

## MOST POPULAR EVENTS

We are excited to bring revived energy to Indy with our new activations and exhibits, but longtime attendees can be rest assured we're also bringing back our most popular events.

On Thursday morning, attendees can begin their Show at our Grand Opening Breakfast, offering complimentary breakfast paired with a live talk-show-style program featuring a special guest, to be announced soon. After a full day of discovering the latest motorsports innovations, attendees will have a chance to unwind and network over complimentary drinks and appetizers at our popular PRI Happy Hour, which will take place in Lucas Oil Stadium beginning at 5 p.m.

Another can't-miss activity is taking a stroll down Machinery Row, an invaluable opportunity for engine builders, welders, fabricators, race teams, and manufacturers to get an up-close look at the



Live racing action returns to the PRI Show with the PRI EV Indy Karting Classic presented by Top Kart USA.

ground-breaking innovations that'll help complete their jobs quicker and more efficiently. Additionally, those looking to upgrade their hauler rigs will want to visit the Trailer Exhibit at Lucas Oil Stadium, featuring dozens of the newest trailers, haulers, RVs, and toterhomes from top manufacturers.

No attendee should miss the Featured Product Showcase (FPS), where both buyers and media will discover the latest and most innovative products from hundreds of top motorsports brands. To ensure these innovative products receive increased attention and foot traffic, the FPS has been relocated to the ICC Capitol Connector, which is strategically located near the Yellow Hall, Georgia Street entrance, Capital Cube hanging car, and the PRI Paddock for maximum visibility.

In addition to networking and browsing motorsports' latest products, services, machinery, and technology on the Show floor, attendees will have valuable opportunities to learn from racing's most innovative minds. With more than 45 conferences, seminars, and social gatherings, there will be countless opportunities to engage with industry experts through a dynamic conference lineup that includes the PRI Education program, Race Track Business Conference, ICMS Annual Congress, and many more.

## ALTERNATIVE RACING

We are dedicated to giving PRI members a complete 360-degree view of the motorsports landscape, which is why we are constantly searching for the next innovation, trend, or regulation that may affect your bottom line. Some changes will affect your company, while others may have a minimal impact, but in an industry where the gap between success and failure is measured in milliseconds, every detail matters.

*"LUCAS OIL STADIUM IS NOT JUST AN EXTENSION OF THE PRI SHOW, IT IS A 'MUST-SEE' AREA OF THE SHOW."*





Top-ranked sim racers will compete head-to-head at the PRI Show, and Show attendees can try their hand in the cockpit, too. Photo courtesy of SRO Motorsports Group.

At the 2023 PRI Show, we are putting a spotlight on the emerging trend of alternative racing—particularly EV and sim racing.

"The PRI Show continues to grow and evolve," said Liaw. "Being the largest B2B

motorsports show in North America, we have to do our part to showcase new trends and the diverse opportunities for racing-related businesses."

Alternative racing has continued to grow in popularity over the past several years, with sim racing seeing big gains since 2020. To showcase the potential of alternative racing to our entire industry, we will activate space within Lucas Oil Stadium like never before, including the return of live racing action at PRI.

Not since the Orlando-era of the PRI Show has racing's most influential business event showcased live racing action. That changes in 2023 with the PRI EV Indy Karting Classic presented by Top Kart USA. With a kart track located on the floor of Lucas Oil Stadium and high-performance electric karts provided by Top Kart USA, this activation will provide entertaining racing action throughout all three days of the Show.

Most notably, Thursday's kart action will feature professional drivers from various top racing series, with serious bragging rights

on the line. Adding to the buzz, the pro main event is slated to be run during the PRI Happy Hour—which has been expanded to the Lucas Oil Stadium lobby, concourse, and field for 2023—so PRI Members can enjoy complimentary drinks and networking, all while cheering on their favorite driver.

Our new PRI eSports Arena will also be making its debut at the Show—a new activation area dedicated strictly to the world of sim racing. This activation will be located inside Lucas Oil Stadium, next to the EV and Alt. Racing area, and will showcase not only EV technology but other forms of racing power, including propane, renewable fuel, and hydrogen.

As for sim racing, that's all about computer power and driver skill.

PRI is partnering with SRO Motorsports Group, which will hold one of its professional simulator races at the PRI Show. The race will be broadcast live for attendees to watch via giant LED screens, with up to 16 top-ranked sim drivers racing head-to-head on fully

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equipped simulator cockpits at the PRI Show. Additionally, there will be two additional simulator cockpits for Show attendees wanting to take a hot lap on the virtual track and discover what sim racing is all about.

Finally, Goodyear will also have a large activation at Lucas Oil Stadium that is already creating some excitement. The Goodyear/Mickey Thompson Experience will curate a selection of race cars that will

line the pathway leading into the stadium, culminating at a Goodyear booth that's sure to generate buzz.

With the motorsports industry continuing to build positive momentum, the 2023 PRI Show is tracking to be one of our largest shows yet. The motorsports tent is bigger and more diverse than ever before, including everything from computer-powered sim racing to 10,000-horsepower engines in tractor pulling. But no matter what powers you off the start line, the 2023 PRI Show is where you'll find the parts, people, and knowledge needed to succeed, both on and off the track.

"You've got to go to the PRI Show to figure out what's the new technology and what are the latest secrets. The conversations you're having in those aisles are ones you can't have at the track, because everyone is focused on their own car. At PRI, you have three days to absorb all this information, take it home, get your parts, and build a car for next year to kick some ass," concluded Davidson. **PRI**

Featured Products Showcase has a new home at the PRI Show. Stop by the Indiana Convention Center (ICC) Capitol Connector at the Georgia Street entrance, near the Yellow Hall, to see the newest race components for the 2024 season.



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# BUILDING CONNECTIONS

FIRST-TIME EXHIBITORS EXPLAIN WHY THEY'RE HEADED TO INDIANAPOLIS IN DECEMBER FOR THE 2023 PRI SHOW.

By Jack Haworth

**T**he roar of the engines falls silent each December, but racing industry insiders know they can't afford to stay quiet.

On December 7–9, the motorsports industry will take over the Indiana Convention Center and Lucas Oil Stadium in downtown Indianapolis for the 2023 PRI Show. Whether they are discovering the latest advances in equipment, attending educational seminars, or networking with thousands of industry professionals, the PRI Show is a once-a-year opportunity for motorsports businesses and professional race teams to invest in the latest racing products and technology this offseason and build momentum heading into next season.

Longtime exhibitors and attendees eagerly anticipate the PRI Show each year, giving it the feel of a giant family reunion. However, everyone is always eager to welcome new faces, products, and companies to Indy. This year, we welcome approximately 100 first-time exhibitors. While their products and services vary, these companies are united in their motivation for traveling to Indianapolis: The PRI Show is the most influential business event in the motorsports industry.

While many showgoers are based in North America, the PRI Show's significance attracts scores of international companies. In 2023, that list includes new exhibitor Tillett Racing Seats, a UK-based manufacturer of high-end carbon fiber seats and accessories.

"The USA is a huge market in which we can see the potential for our products to flourish," said Laura Tillett of Tillett Racing Seats, Sittingbourne, Kent. "We will be attending the 2023 PRI Show as it is a great opportunity to demonstrate our fantastic products to the US trade, create brand

awareness, and give people the chance to feel the comfort and quality of our seats."

The Tillett team is bringing a selection of race seats to demo, including its new C1 and C1XL FIA-homologated 8855-1999 racing seats, and its new B10XL road seat for roadgoing sports cars.

"The company is a family-run business, which stems back almost three generations," said Tillett. "All members of the Tillett family have been heavily involved in motorsport, and their passion comes through in the product design and technology development to create the most stunning high-end racing seats on the market."

The PRI Show is an important North American showcase for international companies, but it's also a must-attend event for stateside companies hoping to gain initial traction in the motorsports industry. We've heard from several first-time exhibitors that've been in business for decades but are just now testing the waters in motorsports—a positive sign that bodes well for the overall health of the industry.

With more than 60 years in the transmission business, GFX is launching its performance line at the 2023 PRI Show, seeing an opportunity to tap into a new market of potential customers. The Miami, Florida-based company will showcase a variety of performance transmission products, including aluminum oil pans, friction plates, sprags, filters, and a new 4L60E Servo Piston (Corvette style) in anodized aluminum.

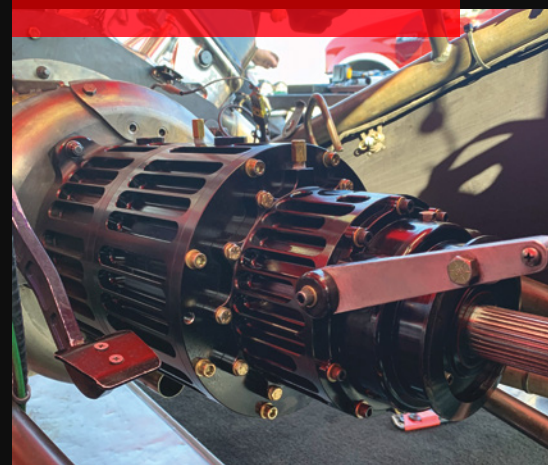
"GFX is not only a distributor, but we also manufacture many hard parts for the transmission industry," said Dios Garcia of GFX. "We can manufacture by original specs,

or for customer specific specs or needs."

Dayton Rogers Manufacturing Co. is another deep-rooted business set to explore new possibilities and partnerships in Indy.

"As a custom metal stamper and fabricator serving many industries, we can provide solutions to your metal-forming needs," said Lisa Matheis of Dayton Rogers Manufacturing Co. "With 90-plus years of experience and four strategic locations in the US (Minneapolis, Minnesota; Columbus, Ohio; Columbia, South Carolina; Arlington, Texas), we offer versatile capabilities and services including assemblies. At the PRI Show, we will display an array of racing-related metal-formed products, and our goal is to develop relationships and be a value-add to your business."

**B&J Racing Transmissions** is exhibiting at the PRI Show to "reach new markets" and "increase our visibility in the markets we currently serve," said Steven Macklyn.





The PRI Show is a terrific opportunity for lesser-known companies to introduce their brand and products to a new industry, while more established motorsports businesses will value expanding their network and building fresh partnerships. The latter goal is what attracted The FOD Control Corporation in Garland, Texas, which specializes in Foreign Object Debris (FOD) control solutions. Its products and services—which include the FOD-Razor, TracSweep, and POWER BAR Magnetic Sweepers—are designed to eliminate debris from track surfaces, preventing damage to equipment and personnel.



“By participating in the PRI Show, we aim to enhance our visibility and increase awareness among professionals and stakeholders in the racing industry,” said Pete MacGregor of The FOD Control Corp. “We want to highlight our partnership with NASCAR as a Competition Partner. The PRI Show also provides an opportunity for our company to connect with race track operators, racing teams, and other key players in the industry to establish partnerships and explore potential collaborations.”

With almost 60 years of experience, B&J Racing Transmissions in Lindon, Utah, is another mainstay in the world of motorsports. Specializing in air-shifted planetary

transmissions, B&J products include auto shifting equipment, air systems, driveline components, tools, and other accessories.

“Many of the pioneers in drag racing used our transmissions,” said Steven Macklyn of B&J Racing Transmissions. “B&J transmission-equipped racing vehicles currently hold multiple speed and ET records in all types of racing, a feat that we are proud of. We realize that the teams are the ones that put forth the effort to achieve the record runs, but they need quality and reliable components to do that. That is where B&J comes into the equation.”

Despite decades of success, B&J Transmissions continues to innovate and will be attending the PRI Show for the first time. Like many other new exhibitors, Macklyn views it as an opportunity to expand the company's network, interface with existing customers, and unveil new products that include ceramic bearings and a boat transmission.

“B&J has a couple new products, and we want to expand our marketing efforts to reach new markets,” said Macklyn. “Additionally, we want to increase our

“We are exhibiting at PRI to connect and integrate more deeply into the high-performance automotive community,” said Christina Carnahan of Elite Tuned. Seen here is Mike Carnahan of Elite Tuned.

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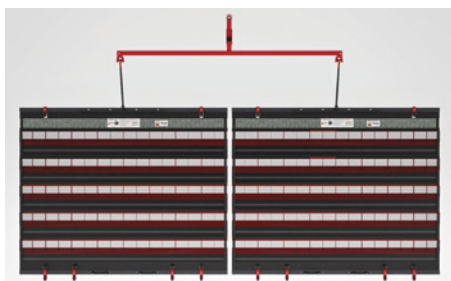
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The PRI Show “provides an opportunity to connect with track operators, racing teams, and other key players in the industry,” said Pete MacGregor of The FOD (Foreign Object Debris) Control Corporation.

visibility in the markets we currently serve.”

From enhancing safety to maximizing speed, the PRI Show is where the latest advances in motorsports are revealed and discussed. Building fast race cars requires premium parts and manufacturing, but utilizing digital technology and education also plays a large role in accelerating on-track performance. Specializing in

education content, the Elite Tuned School in St. Petersburg, Florida, has tapped into this emerging trend and will be eager to share the knowledge at its first PRI Show.

“We are exhibiting at PRI to connect and integrate more deeply into the high-performance automotive community,” said Christina Carnahan of Elite Tuned. “We have worked hard to promote a massive change in the accessibility and quality of the tuning education that is available, and we are here to continue to expand brand awareness. We will showcase what we offer and show how we have structured our school and content to be different from the rest and provide the most complete and comprehensive tuning education on the market.”

## SHOW HIGHLIGHTS

The racing industry runs on innovation. Just as race shops are constantly tinkering to unleash performance, PRI has been focused to improve the show experience and increase the overall value for attendees.

These improvements begin with the relocation of our popular Featured Products

Showcase, which will move to the ICC Capitol Connector to increase the visibility of these cutting-edge products. Thursday evening's Happy Hour will remain in Lucas Oil Stadium where PRI members will be able to enjoy complimentary drinks and appetizers in the second floor lobby area, while simultaneously watching pro drivers compete in the new PRI EV Indy Karting Classic presented by Top Kart USA on the Stadium floor. The new eSports Arena will showcase top sim drivers competing against one another, plus an opportunity for attendees to hit the virtual track for themselves. Plus, with more than 1,000 exhibitors and more than 45 conferences, seminars, and social gatherings held across some 750,000 square feet of exhibition space, Indianapolis is the place to be for any racing-related company.

From track safety to transmissions, race seats to simulators, motorsports is an ever-growing tent. The 2023 PRI Show is where our entire industry comes together for three memorable days in the heartbeat of the motorsports world. **PRI**

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# TO FINISH FIRST...

A new wave of cutting-edge technology in off-road racing is helping teams go faster with better control, improving their odds of making it to the finish line.

By Drew Hardin

For anyone who hasn't been there in person, the rigors of off-road racing are difficult to comprehend. Thanks to advances in live streaming, and drone and in-car video technology, this motorsports segment is getting more media attention than ever. The excitement of off-road racing is coming through loud and clear, yet no video can fully capture the heat, choking dust, or the obstacles—natural and man-made—that off-road racers must endure just to make it to the finish line, let alone to the podium. The old saying, “To finish first you must first finish,” probably wasn’t written about desert racing, but it should have been.

Organized off-road racing has been around since the mid-1960s, and in that time the vehicles and their components have undergone tremendous evolution to help them survive those extreme conditions, while also making them faster and safer for drivers and co-drivers. As often happens in motorsports, technological changes can come in waves. Right now, off-road racing—especially at the upper tiers—is in something of a transition, with significant innovations that are taking speeds and car control to new levels. As Bryan Harrold of Fox Motorsports in El Cajon, California, put it, racers need to “try to rewire their brain completely” to adapt to what their trucks can do now.

## ALL-WHEEL DRIVE

When asked to identify the most significant technological advancement in off-road racing these days, many of our sources pointed to the rise of the all-wheel-drive (AWD) Trophy Truck.

“There’s a big transition of the Trophy Trucks from two-wheel drive, which had long been the desired package because of reliability, to the all-wheel-drive trucks,” said Greg Adler of Off Road Warehouse, San Diego, California. That’s due, he said, to the “evolution of the parts and reliability of the transmission, transfer case, front differential, and the independent front suspension. Some of that came out of Ultra4 racing and the King of the Hammers race, where the guys were building this super-massive, super-strong stuff to survive the rock race. Now that’s morphed into desert racing, where some of the best Trophy Trucks are now all-wheel drive. They’re pretty close to dominating the desert races.”



Several companies build AWD Trophy Trucks, including Brenthel Industries, Jimco Racing, and Racer Engineering, but the pioneer in the field is Mason Motorsports of Lake Elsinore, California, which has built 15 of them and has four more under construction. "Right now, we have about a two-year wait list to start a truck," Neal Mason said. "We're working on things to shorten that, like building a bigger facility, but I don't want to build them too quickly. I don't want to sell 12 Camaros a year. I want to sell four Ferraris."

The advantage to all-wheel drive is traction. Adler touched on the reliability issues inherent in driving the front wheels in an off-road racing environment. It has also been difficult to make front-drive parts work with a lot of suspension travel.

To solve those problems, Mason opted to design and build his own components, from the front differential and axles to the transmission and the rearend, rather than



Andy McMillin was among the racers testing Fox Motorsports' new Live Valve computer-controlled shock absorbers. Fox's goal with Live Valve "is to minimize or remove altogether the compromises typically made in suspension tuning for off-road racing," said Bryan Harrold.

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trying to adapt existing driveline parts. It has been a winning formula. Mason Motorsports trucks won all three Trophy Truck class championships in SCORE's 2022 season, and the trucks continue to win in 2023. Recently, Bryce Menzies won the Baja 500 overall in his Mason AWD truck.

The growing number of AWD trucks has pushed Mason to evolve his products. "When there were only a couple of AWD trucks, they didn't have to push very hard to stay ahead of most all the two-wheel drives," he said. "But now most all the top teams have AWDs. They're all racing each other, and they're racing each other really hard. So we've made some advancements in figuring out ways to keep the drivetrain reliable while driving them harder and with more power." These include a "bigger and more robust" rear differential, updated one-way drives for the front differential, and the Masonmatic five-speed paddle-shifted transmission. It uses "a hydraulic clutch pack like an

automatic and spur gears like a sequential," Mason said, which enables full-power shifts without cutting the ignition and eliminates the problem of a damaged gear restricting access to the others. "If there's ever a problem with a clutch pack or gear, you can skip it. It doesn't have to go sequentially through that order."

## MORE POWER

"Over the last few years, the all-wheel-drive technology has shown up big in our sport where it was traditionally two-wheel drive and typically a small block because you couldn't get a lot of traction," said Kevin Kroyer of Kroyer Racing Engines, Las Vegas, Nevada. "Now it's all-wheel drive and big block-based engine packages. Big blocks have been around for a long time, and even in some off-road stuff, but they haven't been the norm. They're more the norm now."

"Every single AWD we've ever built is either a big block or the Joe Gibbs motor,

which makes more power than the other builders' big blocks," Mason said. "The trucks used to have 870 horsepower. Now a lot of them are 1,100-plus horsepower and a lot more torque."

When asked for output numbers of his engines, Kroyer laughed. "I don't make anywhere near the numbers that everybody in California makes. Everybody else is advertising 1,100, 1,200, 1,300, whatever. As long as we can pass you, we're okay."

Kroyer pointed out that "big blocks have been around for a long time, and people use them in hot rods, drag racing, boats, and all the rest of the stuff. I guess the closest comparison we have to anything that's out there on the market is endurance boat racing. There are some similarities there, but we're trying to push 7,000-pound trucks with all-wheel drive and 30-some-odd inches of wheel travel for up to 24 hours. So they gotta run pretty hard, but they also gotta be reliable."



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## OFF-ROAD MARKET



New communications and navigation systems from Garmin and other makers "allow race vehicles and chase vehicles to be connected via satellite and communicate with each other," and at a much lower cost than earlier satellite-based systems, according to Off Road Warehouse's Greg Adler.

Kroyer said most of his big block builds start with a Chevrolet-based aftermarket aluminum block, "short deck, machined in-house. Dry sump with an integrated pan and pump. Right now we're doing some 20-degree cylinder head stuff, mechanical roller [cam] stuff, and we do our own cam drive design." Induction is typically "eight stacker ITB throttle-body stuff from Kinsler. It's drive-by-wire, a lot of electronics, all MoTeC-based."

### VIA SATELLITE

On the subject of electronics, we asked Kroyer about the possibility of tuning these engines remotely, using the Internet and satellite links. "Tune your truck in the States while you're in Mexico," as Randy Smith of Butch's Speed Shop in Las Vegas, Nevada, described it.

"People are starting to go that direction," Kroyer said, "but we're not doing any of the remote tuning yet. Not on the fly. We've done it with stuff down in Mexico when we've been up here testing, but it's more, make a run, look at data, make changes. We can monitor data in some of the vehicles remotely and call the radio if we need to. But typically, by the time you have that big of a problem, you're not having a great race anyway."

"In theory, that's been able to be done for some time," added Ray Field of Dougans Racing Engines, Riverside, California. "But it's complicated, because you need a router and service to send that information across the Internet. So either you have to have a

helicopter close by, or you have to have an Internet provider on the race car, and that only works so well. So it's not perfect, but yes, that can be done." The Starlink satellite system, Field said, improves the chances of getting a signal in remote locations in the desert Southwest or Mexico.

"Can we be live with the trucks? Sure, we can," Field said. "Have we been live with trucks during races? You bet. Could we tune them? Sure. Do we need to tune them? No. They're tuned when they leave, but we do monitor a lot of things on the race car."

Starlink, and advancements in communication systems in general, are having an impact on other aspects of off-road racing, Adler said. "I have seen a shift in communication technology in terms of keeping the race trucks more connected to the chase teams. Starlink is playing a role for guys to be able to stay connected, whether you're racing or chasing. Some of the guys are even doing live feeds and in-car video using some of that technology. There are also systems, like Garmin inReach, that allow race vehicles and chase vehicles to be connected via satellite and communicate via text to each other and see their location. That's changing a lot of the challenges you had in the past of knowing what's going on or where your race car is if there's a problem. It's morphing from \$5,000 MSAT systems that each vehicle had to have and were very expensive to buy and maintain to something that's a lot more reasonable, whether it's for a Trophy Truck or even a UTV."

## COMPUTER-CONTROLLED SHOCKS

"Imagine a vehicle that could corner on fire roads like a rally car, float over 4-foot-deep whoops in excess of 100 mph, cruise across boulder fields like they aren't there, soak up the huge G-out you didn't see until it was too late, jump over 100 feet with a nice smooth landing even on flat, and be able to speed down a dry lakebed at 150-plus mph. Multiple times, for hundreds of miles, over countless consecutive hours."

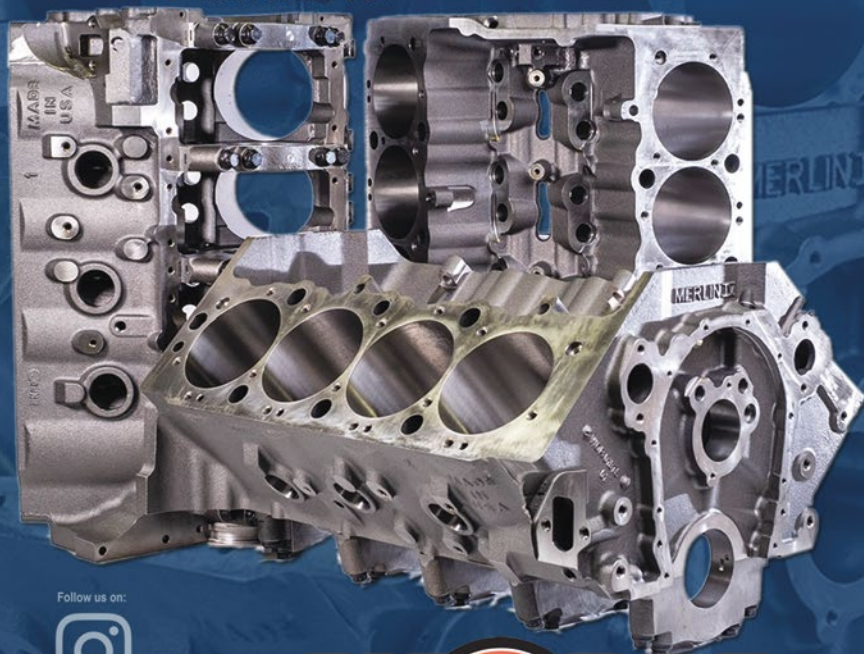
That, said Harrold, is what Fox Motorsports is working toward with the development of its Live Valve semi-active, computer-controlled shock absorber system. "We're trying to optimize your suspension to adapt to a wide spectrum of driving conditions while delivering comfort and confidence-inspiring performance. We want to bring sportscar-like handling to a 7,000-plus-pound whoop-eating machine with up to 36 inches of suspension travel. For a driver, that translates to confidence and reduced fatigue, which is critical for the types of terrains and duration of races they face."

Fox's Live Valve racing suspension collects real-time data every few thousandths of a second from acceleration, braking, steering, and inertial sensors. Using that data, the system electronically adjusts compression and rebound damping through independent oil flow paths, so each compression and rebound adjustment does not affect the other. These are similar to the computer-controlled systems used in OE applications on the Ford F-150 Raptor pickup and Polaris RZR UTV, though "what we've been racing on is the first application on our external bypass shock architecture as well as the first application of Live Valve on both compression and rebound circuits," Harrold said.

"The base Live Valve algorithms are designed to improve typical handling characteristics that might be considered undesirable, especially some that are grossly exaggerated on a platform with significant wheel travel like an unlimited desert truck," Harrold continued. "We have a ton of parameters to play with that affect how those base algorithms behave and

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On the dyno is one of four big blocks that Kroyer Racing Engines built for racers Luke and Dan McMillin. According to Kevin Kroyer, the 555-cubic-inch Brodix block is filled with a Bryant billet crankshaft, Carrillo rods, and JE pistons. Daley Engineering supplies the oil pan and dry sump pump; the heads are from Dart (and use T&D rockers), front engine plate and drive accessories are from ID Designs, and induction is via either Kinsler eight-stack or ITB billet manifolds.

essentially limitless possibilities for more based on driver feedback and additional sensor development.”

Harrold said the feedback from drivers racing with Live Valve shocks “has been extremely positive, and we’ve already garnered numerous podiums and wins with the technology to back it up.” Justin Lofton and his two-wheel-drive Jimco Trick Truck took overall wins at two Best in the Desert races in 2020 and 2021; Cameron Steele and Ryan Arciero put their Live Valve-equipped Trophy Truck on the podium at the 2021 Baja 1000; and Arciero won the 2022 Vegas to Reno race after he put Live Valve on his truck.

Casey Currie of Currie Enterprises in Corona, California, has Live Valve suspension systems on his racing RZR UTVs, and he’s having a system installed on his Trophy Jeep race truck. “It’s pretty wild what it does, electronics-wise. If you turn the wheel left, it’ll stiffen the right side. It’s basically keeping the sway bar under control. You can add rebound on the fly. If you’re hitting a jump, it’ll add compression while you’re in the air. If you’re going down

a graded road, it will keep it soft, so the car has a plusher ride and more forward bite.”

Live Wire development is ongoing, Harrold said, based on data from races and Fox’s in-house Racing Applications Development (RAD) truck. “We’ve made numerous algorithm changes as well as some mechanical improvements to the shocks and related components to optimize performance with everything we’ve learned thus far.” Currently, Live Valve systems for racing “are only available to select race teams that are helping us test and develop it due to its complexity,” he noted. “Once we’re done developing, we definitely want to make it available for purchase on the racing side.”

Live Valve isn’t the only race shock under development at Fox. “The increased availability of data, including the ability to capture our own with vehicle instrumentation and data acquisition, are what really help us drive innovation and advancement,” Harrold said. “We’ve even invested in the biggest shock dyno in the world, specifically designed for Fox with the ability to run our largest shock (Factory Race Series 4.4 External Bypass) to its full capacity. Combined with data acquisition, we can quickly iterate and test multiple designs or tunes before we even hit the dirt, getting 90% of the way there before the old ‘butt dyno’ comes into play. We can even record shock data from an entire race and replay it on the dyno.”

Harrold said Fox is also trickling down some of its latest technology to the more limited classes of racing. “A good example of this is the prototype RAD shocks we built for Cisco Bio’s Class 11 shocks, which was a super fun and challenging project we took on just to see how extreme we could get on the most limited off-road racing suspension platform possible, a stock VW Bug, both in terms of performance and rules. It may not be as technologically advanced as Live Valve, but we packaged external coolers, recirculating finned reservoirs, and DSC adjusters we developed for the bigger cars in an effort to get every last bit of performance out of a vehicle with only a handful of inches of travel and extremely strict suspension rules.”



"Whenever we first activate Live Valve on a new vehicle, the initial reaction is sort of a sense of bewilderment" on the part of the driver, Fox's Bryan Harrold said. "They're confused because the shocks feel soft and compliant, but they don't bottom when they expect it because they automatically firm up when they need to."

## PREDICTABILITY AND CONSISTENCY

There is a cohort of racers who are skeptical not necessarily of Fox Racing's system but of the idea of computer-controlled shocks in general. "If a vehicle is tuned correctly, if it's dialed-in correctly and working correctly, whether it's a Trophy Truck or track car, the last thing you want is a computer changing or adjusting things on the fly," explained Ben Brazda of Filthy Motorsports, Boulder, Colorado.

"Absolutely it has its place in the industry," he added. "Polaris wouldn't put it on their rigs if it didn't sell. But for a racer, the most important things are predictability and consistency. Racers are pushing vehicles to the absolute limit, and the only way they're able to do that is by trusting the vehicle. They've spent weeks tuning that truck to handle the terrain. Weight balance, weight distribution, anti-squat, anti-dive, everything about the truck is dialed in, and it's working really, really well. Would you ever introduce the risk of a computer system changing things? No. You have to be able to trust the suspension system. It cannot change. It needs to be consistent. That's why you see all the traditional-style coilovers and bypass shocks on Trophy Trucks, and they're fixed."

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*“WE CAN EVEN RECORD SHOCK DATA FROM AN ENTIRE RACE AND REPLAY IT ON THE DYNO.”*

suspension systems “have to do with the fit, the finish, and the build quality. When it comes to Trophy Trucks, the reason you see King shocks on everything is because that technology is really on the manufacturing side of things—CNC machines, high-quality materials, super tight tolerances, quality control. But ultimately, you still have a very simple shock for that reason.”

We asked Mason if Live Valve technology was being installed on his AWD trucks. He said a couple of teams are using it during races, but most who put it on his trucks are testing the system but not yet racing with it.

“It has great potential to be the must-go-to in the future,” Mason observed. “To get there, though, you have to have a person

who not only understands how to tune suspension the analog way, but you also have to have somebody who understands what the truck needs to be looking for digitally to do that, and what changes you want to have it make. So it takes two different kinds of people, a very smart computer programmer and a very good shock engineer. Those two people have to communicate. The problem is, right now one of those people is an artist, and the other person’s an engineer. One person does everything by feel, while the other person is numbers. It’s going to take some time for them to work together, to communicate in the same language. Once that happens, then you’ll really see that take off.” **PRI**

## SOURCES

**Butch’s Speed Shop**  
butchsspeedshop.com

**Currie Enterprises**  
currieenterprises.com

**Dougans Racing Engines**  
dougansracing.com

**Filthy Motorsports**  
filthymotorsports.com

**Fox Motorsports**  
ridefox.com

**Kroyer Racing Engines**  
kroyerracingengines.com

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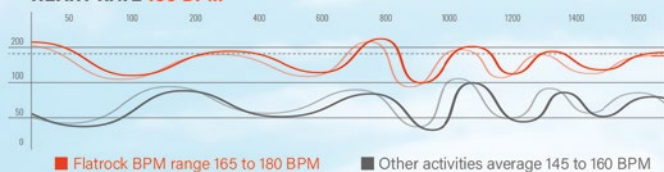
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As side-by-sides get sportier by the year, aftermarket opportunities abound to turn them into dedicated racing machines.

By Drew Hardin

“I’m old enough to remember when UTVs were only Ranger vehicles at state parks,” said Matt Scarpuzzi of Savage UTV, Alpine, California. “That’s where the name came from, utility vehicles. I remember the first year [race team] Jagged X was racing in Baja and people said, ‘That’s never even going to finish.’”

“They were never intended to race,” added Justin Smith of Shock Therapy, Phoenix, Arizona. “Everyone had to build pretty much everything on the car to be competitive.” Now, however, “UTVs are certainly the fastest growing class in off-road racing, and the UTV class has started to knock on the door of overall race times for Class 10. Class 10 is a pretty fast class, the fourth fastest class in off-road racing. UTVs are getting to where they’re faster than half the field.”

It was Polaris, Smith said, that started the “UTV arms race” with the introduction of the RZR XP 1000 in 2014. In 2022, Polaris introduced the RZR Pro R, “the most capable UTV in history to date,” Smith said. “You can race it stock and not have to touch anything on there from a breakage or structural standpoint. It really is an off-the-showroom race car.”

“We can spend \$150,000 building a Pro R, or you can get one from the dealership, add window nets and a radio, and be ready to go,” Scarpuzzi pointed out. “The suspension is really good out of the gate, and the cage is so much better. They used to come with literally seatbelts, and now it’s four-point harnesses. I think these manufacturers are starting to see what people are spending their money on after the initial purchase, and they’re starting to include some of that equipment in the original layout of the vehicle.”

That doesn’t mean there isn’t room for improvement. Racers being racers, parts have been developed to make the Pro R faster, safer, and nimbler. Although, “the Pro R being new, it’s very expensive to build, maintain, and race,” Scarpuzzi said. The fact that a Pro R has a two-liter, four-cylinder engine also relegates it to Unlimited classes in certain series, or classes just for Pro Rs, as the rest of the UTV racing field is powered by two- or three-cylinder engines of 1,000–1,300cc. “So really, the top, top names in UTV racing are in that class, and a majority of other racers are still in the other classes.”

That means there are plenty of opportunities for building Polaris, Can-Am, or other brands of side-by-sides for racing. “The biggest question that you have to start with is, what is the race series and class?” said Dan Fisher of



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## UTV RACE MARKET



Brian Crower Inc. specializes in building UTV engines for "the dune style of riding, which is more wide-open throttle," said Brian Crower. The company's billet crankshafts are key to engine durability in a high-horsepower application.

Lone Star Racing, Mesa, Arizona. "And then, having a budget in mind is important. It's very easy to get carried away. There's needs, and there's wants."

### ENGINE UPGRADES

This is an area where builders and racers need to do their homework, especially where the Pro R is concerned. "In the Best in the Desert series or any American series you can't touch the motor," Smith said, "though in the SCORE races in Mexico they do allow you to play with the motor."

"There's something like 10 different short course series going on, and they all have different rules," said Brian Crower of Brian Crower Inc., San Diego, California. "The rules are just all over the map based on what series you're in. The rules could say you can run cams, but you can't run aftermarket rods or pistons. Or you can't run anything that didn't come from the factory."

One racing segment where the rules are more liberal, "at least in the higher up classes, is sand drag racing," Crower said. "The Sand Outlaw Series has single-handedly pushed the boundaries in that segment. There are guys who, with a 900cc

engine, are making 1,000 horsepower to the crank, which is pretty respectable coming out of a little two- or three-cylinder engine."

Another "growing horsepower segment, especially in the Southeast region, is mud bog or mud pit racing with the Southern Bounty Series and Mud National events," Crower said. "They are doing big-horsepower builds similar to the drag crowd and draw thousands of spectators."

Building side-by-sides for the sand is Crower's focus. "A lot of the bigger horsepower builds, which involve our cranks, rods, and pistons, are geared toward the dune style of riding where it's more wide-open throttle." In this segment, the two-cylinder Polaris RZR XP Turbo and three-cylinder Can-Am Maverick X3 "cover literally 70% of the market," Crower said. The rest of the "engine totem pole for hot rodding" includes the three-cylinder Yamaha YXZ; Polaris Pro R; and the two-cylinder Polaris XP 1000, Honda Talon, and Kawasaki KRX.

How does Crower build a 1,000-hp Can-Am engine? A combination of Darton aftermarket sleeves in the stock crankcase, bigger ARP head studs, Crower's billet crankshaft and connecting rods, King main rod bearings, bigger wrist pins, either CP or BME pistons, a ported cylinder head, Crower's camshafts and adjustable cam gears, "and then as big a turbo as you can run," he said. "These guys were running 70 pounds of boost last year. This year it's 80, and next year it's going to be 90, and they're starting to run compound turbos." With these big turbos, "there's obviously a lot of lag at the bottom end," he added, but his stroker crankshafts "build more boost quicker with the torque that they deliver."

"These drag cars are unreal," Crower continued. "They're doing 300 feet in 3.4 seconds—in sand."

Most of the sand drag classes limit engine displacement to 1,300cc "because the Can-ams have a 1,200cc snowmobile engine they want to cater to." To make the two-liter Polaris Pro R eligible, Crower developed a de-stroker crank that turns it into a 1,300cc, four-cylinder engine.

"Word on the street says the 2024 Can-Am will have a 1,600cc engine with a transmission—meaning no more belt—





Dual-rate spring kits are among the suspension upgrades available from Shock Therapy for the Polaris RZR XP (seen here) and other models, including the Polaris Pro R. The springs were designed to reduce washboard chatter and bucking through whoops, while also increasing bottom-out resistance.

so that will revolutionize the game,” Crowder said. “And Polaris is already working on a turbo version of the two-liter.” Crowder predicts that these new developments will generate interest in second-hand UTVs. “Guys will realize they can buy a 2016–2018 turbo RZR for 10 grand, then put another eight grand in the engine. Now they’ll have a 300-hp RZR, and it only cost them 18 grand, compared to a brand-new Pro R, which is like 55 grand from the showroom. And everybody who wants to buy a new Can-Am will put their old Can-Am on the market, and the savings guys will get by buying a used X3 can be put into the engine or clutching.”

Crowder also acknowledged that sand-drag power levels can be incompatible with racing elsewhere. “In short-course racing you can overpower the track. So even with turbo builds you don’t want to have more than 250–270 hp because you’ll have wheelspin and you won’t really be able to control the car.”

“I don’t think horsepower wins off-road races. It’s the chassis,” Smith said. “It’s how you can run through the whoops, and how you can run through big stuff without ever having to hit the brakes. And whip in

a corner without rolling the car. Those two things right there make you fast.”

“Guys are welcome to supply me with a built motor,” Fisher said, “but I don’t think you need anything like that. Having a car that is reliable race after race wins races.”

## SUSPENSION & TIRE UPGRADES

The Polaris Pro R is available with “an electronically controlled Dynamix system with Fox shocks that are all live adjustable, so it shines when things get rough,” Smith said. “About the only thing we’re doing with those before we race it is a set of aftermarket ball joints, because the factory ones are a little questionable.”

Shock Therapy “makes a ton of parts for the Pro R,” Smith added, “and they do get quicker with some shock mods and spring packages.” The company offers dual-rate springs and a Ride Improvement System, which adjusts the internal valving to increase bottom-out resistance at full compression and soften the ride quality at low and medium speeds. For other Polaris side-by-side models, Shock Therapy offers dual-rate spring kits, shock upgrades,

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## SPEED UTV

"The race series have done a great job of trying to make off-the-shelf, production-built UTVs raceable, but I wouldn't recommend it," said Todd Romano of Speed UTV, Anaheim, California.

"There is not enough safety or reliability built

into a production-based UTV to go racing. At Speed UTV, our intention was just the opposite: to build the very first production car that you could pick up at the dealership and go racing. There's nothing to add to our car outside of a fuel cell, and maybe GPS and intercom radios."

Speed UTV is the brainchild of racers Robby Gordon and Todd Romano, who spent years working on developing UTV technology for companies that included Polaris and Textron. Romano was also a pioneer in UTV accessories, having founded Dragon Fire Racing and developed the Team Green Factory accessory line for Kawasaki and its Teryx.

Speed UTVs are available in three lengths: a two-seater with a 95-inch wheelbase, a four-seater with a 120-inch wheelbase, and a two-seat, 110-inch wheelbase model Romano calls "the ultimate desert wheelbase for a sub-80-inch-wide car." The company's 999cc, two-cylinder, turbocharged engines make between 225–300 hp and are fitted with three-speed CVT transmissions. Standard tires are 33s; 35s are optional. Steering is hydraulic.

The Speed UTVs are built with "the SCORE-legal race cage from the factory," Romano said. "Because it's bolted on, you just have to weld where it's bolted and it's legal. We're the first manufacturer to have intrusion bars on the front of our cage and the B-pillar for roll-over. Without that B-pillar bar, the cage collapses on your lap if you do a forward roll. We also have produced our cage for FIA in a continue-tube version—it cannot be a bolt-on cage that is welded—that passes all FIA standards."

A big point of difference between Speed UTVs and others is the trailing arm design of their rear suspension, which gives it negligible track changes through the full range of travel. "Under a half-inch," Romano said, "which allows for greater wheel travel and reduces the track change and leverage issue that compromises drivability and breaks suspensions on other cars."

The top-of-the-line RG Edition includes "Speed carbon-fiber racing seats, Speed five-point racing harnesses, window nets, and production two-piece beadlock Speed wheels," Romano said. Available Speed-designed and manufactured accessories include fuel cells, thicker skid plates, light bars, radio/intercom, and a Wilwood brake kit "for the guys racing with 35s."

Romano said Speed UTV is working with "about 100 dealers, mostly in the Southwest, the Upper Peninsula panhandle, and the southern belt. We are in our first year of shipping cars and have 16,000 on order right now. To put that in perspective, in the category that we're playing in, which includes the Pro R, the Turbo R, and Can-Am X3, there's about 80,000 units sold a year." —Drew Hardin







When building a Polaris UTV for competition, Lone Star Racing relocates the fuel cell from underneath the seats to between them, which lowers center of gravity. "It definitely gives it more of a Can-Am feel when you sit in it because you're sitting so low," said Dan Fisher.

the Ride Improvement System, and other components. Upgrades for Can-Am X3 models include dual-rate springs, sway bars (and adjustable links), and Fox's IQS adjustable shock system.

Smith is also designing some new products for the Pro R that he didn't want to discuss in detail just yet. "They will be electronic products that make these things even faster than they currently are. Or safer. Or both."

Craig Stumph of Pro UTV Parts in Delta, Utah, takes a different approach to suspension mods. In his area, rock crawling is more popular than open desert racing, so he builds UTVs to climb boulders.

"The trailing arms on these Polaris machines work great for desert racing, but for anywhere like our rock crawling, they hang up on rocks really easy and you get stuck. We have another trailing arm made by ORB that we sell for these cars. They give us an additional five inches of clearance."

Stumph is also engineering UTVs to mount 39-inch-tall tires. "When you roll up on one of these cars on 39s it looks pretty freaking cool," he explained. The tall tires require aftermarket A-arms and gear-reduction hubs known as Torque Vector Multipliers (TVMs). The TVM 25% gear reduction hubs are manufactured by Hymark Performance and distributed by Pro UTV Parts. They are different from the current portal design. TVMs add 2 inches of width per side and only 3/8 of an inch of lift. "You just bolt the gear reduction on the hubs and you're in business."

Stumph pointed out that "when you start changing the tires and the gear ratios, you

have to match the CVT to the changes you've made. That makes a lot of difference in these cars."

Upsizing the tires on a Pro R from the factory 33s to 35s is a popular modification, "but there are definitely some upgrades that you need to do around the 35s, like wheel studs and things like that," said Fisher. "It's a lot more load on the back of them, especially if you start running tire balls [run-flat inserts]."

"We put 35s both on the race car and on the prerunner, and they make such a big difference when you get in the big stuff," Scarpuzzi said. "It's able to just float over some of those bigger whoops. And the added ground clearance obviously is huge when we're running these Baja sections where the ruts are so deep from the Trophy Trucks."

## CAGE AND SAFETY UPGRADES

"I'm a dad and not a young man, so for me, the safety thing—being able to come back home—is big," Scarpuzzi said. "I was really excited to see the Pro R had a fully welded cage. Every naturally aspirated car, the Turbo S, all of those were bolt-together cages with 1.75 tubing. This Pro R from the dealership, having fully welded, 2-inch tubing, is something that guys who are building a race car for the first time, and are on a real strict budget, are going to feel better about that than racing something with a bolt-together cage."

For racers in the top tiers, "our cages are all custom, usually DOM tubing or chromoly," Scarpuzzi added. "At the upper end, we replace all that stuff. But for the local races



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## UTV RACE MARKET



Based in Utah, Pro UTV Parts builds many side-by-sides for rock crawling. It is developing a system to bolt 39-inch tires on a UTV using aftermarket A-arms and gear-reduction hubs.

where I live, I see a lot of cars racing with a lot of stock components."

At Lone Star, "we do semi-custom chassis," said Fisher. "When we do one of our full-race builds, we always have a lot of involvement with the customer, to give them what they want while keeping within the safety rules of the class."

"We focus on weight, without sacrificing durability," he added. "We build a car that can handle a lot, but not weigh a ton." He said some racers "want us to stretch the rules on material thicknesses, but at the end of the day, it's such a minimal gain to do that—maybe 20 pounds—that if you do end up having a bad wreck, you'll have to scrap the car because it just doesn't hold up."

One big change Lone Star has made to several Polaris models, including the Pro R, is to lower the car's center of gravity by relocating the fuel cell. "We do not put the fuel cell under the seats. It goes down the center," Fisher said. "We have a few options on capacity, from 26 gallons all the way up to 33 gallons. It definitely gives it more of a Can-Am feel when you sit in it because you're sitting in it so low. It's not your typical position where you sit up in a Polaris."

Adding a fuel cell is a common upgrade, both for safety and range, but "don't go overboard," Fisher advised, citing a "less is more" philosophy regarding weight. Size

the cell "depending on what race series you're running." He races Best in the Desert and the Mint 400 with a 21-gallon fuel cell, while Scarpuzzi uses a 46-gallon fuel cell for Baja racing.

Brakes are another popular upgrade, depending on the model. "The Pro R has really good brakes on it," Stumph said. "Can-Am brakes are not as good, but Wilwood makes kits for those, and we sell those. Some of the ceramic pads that are out are a little bit better than the sintered." Racers who run in the mud "are using bronze pads because a standard or ceramic pad will wear out," he added. "The mud in the water is extremely abrasive, like using a grinder on them."

Fisher said he uses a Wilwood master cylinder on his side-by-side. "That's worked out around all the stock calipers. It gives us a little bit more fluid, a little bit better piston."

One upgrade that Scarpuzzi called "an absolute game changer" was the addition of a satellite communication system. "We have sat phones wired into our intercom system, and all the chase trucks have it, so when I talk in the car, every truck hears me. We are able to coordinate the logistics of getting chase trucks to a pit, or if a chase truck can't get to a pit, another one can cover it."

His team also added a Starlink system to the chase trucks, "so they can get on the

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Internet anywhere, and they can pull up SCORE's official live tracking. They can see where our competitors are. When I come into a pit, they can tell me, 'Hey, you're in third place, you're two minutes behind this person. And we see this person is four minutes behind you.' They tell me what my back door is, so I know how much we need to push the car.

"All that communication and information is so important, especially when we're really close in points for a championship and we start to get closer to the Baja 1000," Scarpuzzi added. "It's expensive," he admitted, "but for upper-level racing, it's a must-have."

As Scarpuzzi sees it, there are multiple tiers of UTV racing. "There are the guys racing with factory support and big budgets, the guys you see all over the magazines. But it is amazing to see the field of recreational racers out there. It's a different level of racing, but the fun, the excitement, the challenge, the competition is exactly the same." Within that group of enthusiasts are those who can "go to their dealership, get a car, upgrade the harnesses, and add some safety features, and they're out there, rubbing paint with 10 of their buddies. But the majority of people still want to build their own setup, because it's easier to do that, keep modifying, keep upgrading over the years to make the car exactly what you want." **PRI**

## SOURCES

**Brian Crower Inc.**  
briancrower.com

**Lone Star Racing**  
lsracing.com

**Pro UTV Parts**  
proutvparts.com

**Savage UTV**  
savageutv.com

**Shock Therapy**  
shocktherapist.com

**Speed UTV**  
speedutv.com

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# BUSTED KNUCKLE OFF ROAD

These passionate riders turn out production buggies while attracting a following with their savvy social media.

By Andy Heintzelman

It was about 11 years ago when an off-roader from Georgia brought his tube-chassis buggy to Jake Burkey for fabrication work.

Burkey, a mechanical engineer who had a day job as a project manager at a nuclear plant, was tinkering with off-road vehicle fabrication and repairs on the side.

Although he had worked on many off-road vehicles since he was a teenager and had beaten his own Jeep Wrangler into submission on the trails of the Southeastern US, this buggy changed his life.

"I'll never forget," Burkey said. "When that thing dropped off the trailer, I said, 'I'm dedicating my life to this.'"

He recalled the story with a laugh, but he wasn't kidding.

By 2018 Burkey's commitment to building full-size off-road buggies would lead to his partnership with Busted Knuckle Films founder Matt Myrick. Together, they launched Busted Knuckle Off Road. Myrick, who has a degree in construction management, and Burkey have offices side-by-side in their 26,000-square-foot shop in Cullman, Alabama.

A unique combination of engineering innovation and social media savvy has them producing \$100,000-plus production volume buggies and attracting online followers by the hundreds of thousands.









Appropriately, the two 38-year-olds met through off-road events where Myrick had filmed Burkey's "big wrecks."

"I think I can do the technical side and you could do the marketing side," Burkey recalled telling Myrick. "We could really build something."

That's exactly what they've done. After just five years from building the first custom buggies, Busted Knuckle Off Road is knocking out a turnkey production buggy about every three to four weeks while also creating a parts inventory—much of it designed and manufactured in-house—of around 4,000 products.

The company's "rock bouncers," a handful built for racing, have sold across the United States and beyond. Busted Knuckle parts also sell worldwide to off-roaders who retrofit their own rides.

"We've been able to have 22 employees and grow to where we're at in a very short period of time," Burkey said. "We've built



"We're bringing a market to people who otherwise wouldn't be able to be in that market," said Jake Burkey about Busted Knuckle's rock crawling buggies. "Not everybody has fabrication skills. But everybody thinks off-roading is a blast."

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buggies and took them all over the world.”

While Myrick had established the Busted Knuckle brand—so named for the willing sacrifice of he and his friends in college while feverishly wrenching on their off-road rigs to get back to the trail—it went to a new level when Burkey started doing tech videos. He believes it added to the notoriety from his daredevil off-roading videos and buggy racing success.

“It positioned me as a professional in the industry,” he said. “We’ve grown the business around that.”

## PARTS DRIVE REVENUE

Buggy building once meant welding one-off creations in a basement or garage, but the market has changed.

“Polaris and some other companies started doing the four-wheeler thing and really hit the nail on the head when they started doing the side-by-sides. That really exploded,” Burkey said. “Being able to make



Lightweight brake rotor packages, ball joint eliminator kits, and a joystick-controlled rear-steer system are among Busted Knuckle's most popular products.

it simple for people to own and get into the hobby is why Polaris is so successful.”

He says Busted Knuckle is doing the same, though at a higher price point and with larger vehicles.

“We’re bringing a market to people who otherwise wouldn’t be able to be in that market,” he said. “Not everybody has

fabrication skills. Not everybody has a welder and a torch. But everybody thinks off-roading is a blast.”

Busted Knuckle generates some \$5 million in manufacturing and retail sales annually. While the buggies rightly get most of the attention—who can look away from a 700-horsepower, powder-coated beast,

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available with a supercharger and rear steering, with 43-inch tires?—it is the retail components that produce some 80% of the revenue.

"Building a widget, putting it in a box, and shipping it out is much more profitable than building these buggies, because I just have so much manpower that goes into them," Burkey said. "We're more of a manufacturer than anything."

He said most of the parts are designed and manufactured with the goal of retailing them. Current hot sellers include a lightweight brake rotor package, weatherproof relay/fuse center, and a ball joint eliminator kit.

Automation became critical when Busted Knuckle switched from custom to production building. Burkey studied how to "scale" the work, "and that's where the automation came in," he said.

He trained himself in Solidworks and CAD and began to meld design and manufacturing. Busted Knuckle's body mount tabs are a good example.

"I can send a file to the laser and have it cut 1,000 of those...and you have a product you can retail, and a product you can train an employee to build," he said.

Busted Knuckle has a Haas VF-4 Series vertical machining center that produces

yokes, sway bar arms, brake hats, transmission adapters, and other parts; and an Okuma four-axis mill-turn lathe with a large bed used to spline its own axle shafts and cut and turn link bars and handles for their rear steering mechanism.

A Dragon Tube and Pipe Plasma Cutter from Bend-Tech uses software that automatically creates bending patterns and notches in tubing, and a plasma head that cuts and engraves the tubing.

"Our entire structure is built out of tubing, and the body panels are attached to the tubing, so it makes the assembly extremely rigid," Burkey said. "It's just a lot stronger way to build. Our entire chassis is built off of that machine."

Busted Knuckle's latest machine purchase is a 2022 Bodor laser cutter, a 6,000-watt machine with a "fiber" laser, known to cut faster and finer than CO2 lasers.

It's economical for cutting and engraving, but it's especially valuable for cutting thick metal, such as the 3/8 plate used for Busted Knuckle's Ultra Light rotor brake package, at extremely tight tolerances.

The laser cuts the holes where body panels bolt to the chassis, and laser engraves the bend borders and bend locations right onto the part. "So I can take that plate and go straight over to the CNC



## TRAIL RESPONSIBILITY

Busted Knuckle Off Road sells a range of gear designed to help build its brand.

It includes the typical—hats, shirts, and hoodies—but also neoprene magnetic coozies, Croc charms, and trail trash sacks. The latter builds the brand not only through the product, but by how it's used.

"You've got a place to put trash—yours or that found along the trail," said Jake Burkey. "It helps the image of off-roading people. We're also cleaning the trails up because it's the right thing to do."

The bags are very popular. "It sounds weird saying it, but they want to be like us," he said about customers. "We're out there acting like fools; they're going to act like fools. We're out there picking up trash, they pick up trash, too." —*Andy Heintzelman*

press brake, and it will have a line going across the part and it will say bend here, up 25 degrees," he said.

The "very popular" automatic self-centering rear-steer kit controlled by a joystick is another recent engineering feat for Busted Knuckle. "You grab the joystick and turn it left or right, the rear tires turn left or right. As soon as you stop turning with the rear joystick, the tires automatically come back to straight and stay there," Burkey said. "It increases the maneuverability of the vehicle 10-fold. It allows you to dodge obstacles, it allows you to climb at different angles, it allows you to show off to your friends and be the coolest person at the Christmas parade."

Burkey said Busted Knuckle's latest accomplishment is the release of its T4 model four-seat buggy. "We are most excited to

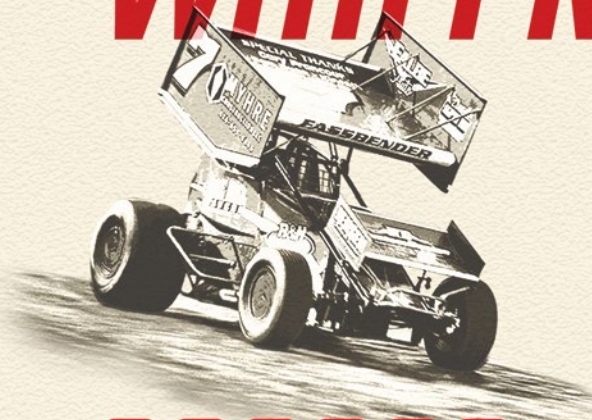
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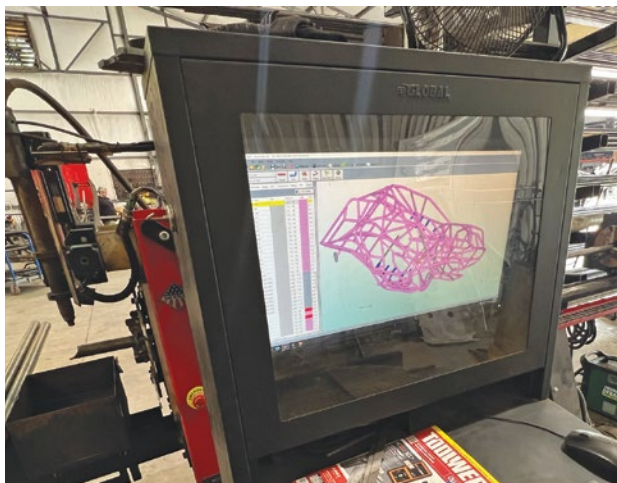


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## BUSINESS PROFILE



To scale up from custom builds to production, Jake Burkey taught himself Solidworks and CAD. "I can send a file to the laser and have it cut 1,000 of those. You have a product you can retail, and a product you can train an employee to build."

reach a larger audience by allowing families to off-road together," he said.

The T4 can actually accommodate five people if the passengers are children, he added.

### PARTS ON THE SHELF

All Busted Knuckle buggies, available in Ride, Vision, and T4 models, have a 17-digit VIN number, allowing customers to order replacement parts with ease.

Todd Ryon of Oneida, Tennessee, bought his Ride unit in December 2021 after having witnessed the durability of a Busted Knuckle buggy at King of the Hammers.

"That terrain is so demanding; it's brutal," he said. "To keep a buggy together for six to seven days and not break an axle, not break a driveshaft...it's something that is built well."

Not having to locate and then replace parts while on a trip is valued for those who trailer their buggies across the country to ride. "You can go out there and have peace of mind," he said. "When I get there, I'm riding!"

When he does need parts, often "self-induced," Busted Knuckle's customer service is "second to none."

"Everything that's on my buggy they can pull it up and send you the exact replacement part. The parts are on the shelf," Ryon said.

A smooth ride is what convinced Jerry Hoover and his wife, Marsha, of Monterey, Tennessee, to purchase a Ride unit in July 2022.

In a test ride at the Busted Knuckle property, they launched off a jump about 5

feet into the air (Burkey went twice that high in his demonstration) with the rough landings of past buggies as a reference point. In the Busted Knuckle unit, "it was like landing on a pillow," said Hoover.

"You notice what you pay for," he said, crediting Busted Knuckle's use of shock bypasses.

Like Ryon, Hoover values the durability of Busted Knuckle parts. "Going out with other guys with Busted Knuckle buggies, and watching them beat on these things, I had a much higher appreciation about how damn solid they are," he said, "and I've become much more aggressive in my driving."

### SOCIAL MEDIA

Burkey said the tight-knit off-road industry in the Southeast has been following him on social media since he was a teen working on Jeeps "in the rocks" of his driveway. Combined with Myrick's spectacular filming, they've been "really successful in creating the brand" and attracting followers.

There are the buggies, of course, and their wild rides up boulder-filled creeks and seemingly impossible rock faces, but there are also plugs for parts sales, merchandise, and sponsors. An ESAB welder, a can of WD-40, or a Baileigh Industrial machine might be integrated into videos for these valued sponsors, subliminally or quite obviously.

It has resulted in Busted Knuckle Films having more than 833,000 YouTube subscribers.

Myrick stressed that fancy equipment is

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not required for filming. "It can all be done on your phone," he said. "Always focus on the story you are trying to tell, and make sure it is something you are passionate about."

Yet social media success is not as simple as merely having content. "You have to be different. You have to be unique," Burkey said. "You have to have a niche that's something that's better than everybody else or more intriguing than everybody else."

Posting frequency alone isn't enough. "People say you've got to post twice a day. Well, if it's about something nobody cares about, it doesn't matter," he said. "You've got to post twice a day and have content that people find amusing, informative, and also intriguing."

Burkey believes Busted Knuckle has become successful because it is an industry leader that is effecting change. "We come out with products and we test them, and then it filters to the market. People want our products because of the brand and our success," he said.

It doesn't hurt, he acknowledged, that "we're always doing something crazy."

"We built a 1,600-hp off-road buggy with a big block running on alcohol with 35 pounds of boost," he rattled off. "I mean, it's a Pro Mod, five-second drag car motor in an off-road buggy."

That particular ride was so popular it inspired the creation of a toy RC car, the Axial Ryft, that is sold worldwide in retail stores.

A vehicle that bold speaks to Busted Knuckle's drive to break boundaries. But for those seeking success in a high-performance business, Burkey's advice is much more controlled. He relates it to his switch from custom to production buggy building.

"The number-one thing I would always suggest to somebody in business is don't let people drive your vision for success," he said. "You get a young guy who's starting a business and has this vision...and thinks that he has to say 'yes' to every single client and every idea they come up with no matter how absurd it is. If you don't think it's going to work, don't do it," he said.

"You have to trust your gut. And doublecheck your gut with your mind," Burkey concluded. **PRI**

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By Bradley Iger

**B**ack in the mid-1950s, fabricator Art Ingels was working at Kurtis-Kraft. At that point in time the Glendale, California-based shop was the nation's top midget race car builder, so Ingels' interests naturally gravitated toward diminutive platforms.

He wanted to take the quarter-midget idea a step further, so he began piecing together chromoly tubing in his garage to build a simpler, lighter, and smaller chassis, and he

eventually paired it with a 2.5-horsepower two-stroke engine from a lawnmower. Ingels' creation was an immediate hit when he debuted it in the pits at a Pomona Raceway event, and by 1957, a group of intrepid DIY racers had begun competing with their home-built karts on the Rose Bowl parking lot's wide expanses of asphalt.

"At that point it was very much the realm of tinkerers," observed Dan Roche of Briggs & Stratton Racing, Wauwatosa, Wisconsin, "people who could weld and had access to small engines who basically just said to themselves, 'That looks like fun—let's give it a try.'"

Over the next decade the concept of

competitive karting started to take shape, but it wasn't until the 1970s that it really began to develop into a motorsports discipline of its own. "That's when manufacturers started to take notice of it as a potential market, and they started bringing purpose-built chassis, tires, and other components into the space," Roche said. "The European side of kart racing really pushed the maturity further in the 1980s. That's when you start to see Italian engines and chassis really becoming the gold standard for the sport."

Today you'd be hard-pressed to find a driver on the Formula 1 grid whose early career in wheel-to-wheel racing didn't include a stint in karting (see sidebar with driver Oscar Piastri on page 108). Although the sport has seen some significant changes over the past decade or so, it's still





## KARTING

considered an important steppingstone for young drivers who are looking to establish a long-term career in road racing—and for good reason.

### BUILDING A SOLID FOUNDATION

“There’s simply nothing that provides the same level of competitiveness that karting on a sprint track does,” said Brad Zoeller of TS Racing, Bushnell, Florida. “You will never race with more people that close together with that same level of intensity. That’s what makes it such a good training ground for young drivers—you learn a skill set that can be translated into big-car racing.” Beyond developing car control and general racing strategy, karting also allows competitors to familiarize themselves with other crucial aspects of motorsports very early on.

“Although it’s a rigid chassis without a suspension, you still have camber, toe, ride heights, and other setup variables to contend with, and small adjustments can make a big difference,” he explained. “Tire pressure adjustments, for example, are typically made to the tenth of a psi.”

But as Andy Seesemann of Full Throttle Karting in Orange, California, emphasized, sheer accessibility is perhaps karting’s biggest draw. “Today there are teams spending upwards of six figures, but you can still find a \$3,000 used kart on Craigslist and go to a track to run laps for \$50.”

The emergence of indoor karting tracks has made the discipline more accessible than ever. “That has brought the concept to the masses in a way that just wasn’t available in the 1990s,” explained Mike Smith of K1

*“THERE’S SIMPLY NOTHING THAT PROVIDES THE SAME LEVEL OF COMPETITIVENESS THAT KARTING ON A SPRINT TRACK DOES.”*

Circuit, Winchester, California. “Back in the day, you kind of needed to be in the know. As a kid, I found out about karting because of a dirt race that was held at the local horse arena. But now you have all these indoor facilities popping up, and they remove even more barriers to entry. A parent can bring their kid to one of these tracks and kind of dip a toe in the sport to see if a larger investment makes sense.”

### FROM THE GARAGE TO THE F1 GRID

Another factor that has helped karting gain traction in recent decades is a class structure that allows young drivers to move up the ranks progressively rather than being immediately dropped into the deep end of the pool.

“That structure makes the sport more approachable early on,” said Roche. “You have the Kid Kart class for ages 5 to 7, the Cadets for 7 to 9, Sportsman for 9 to 11, Junior for 12 to 15, and then anyone 15 or older runs in Senior. So by the time you’re 15 years old, you could have potentially participated in four or five different classes. That means you’re always going to be competing against other drivers that are at

A recent trend in karting is the emergence of a race team support business model, where a team is supplying not only racing gear but also services like coaching and data. It’s akin to an arrive-and-drive program, said a source. Photo courtesy Briggs & Stratton.







The skills young drivers learn in karting, from car set-up to finding the racing line and experiencing the intensity of driving wheel-to-wheel in traffic, all translate to racing in other forms of motorsports. Photo courtesy Briggs & Stratton.

your development level."

As we've seen in a number of other motorsports disciplines in recent years, spec-style racing has become incredibly popular in karting. "Today the sport is essentially divided between two-cycle engines and four-cycle engines," Zoeller said. "Possibly the biggest change we've seen over the past 20 years is the introduction of a sealed four-cycle motor—the Briggs and Stratton Local Option 206. That's now the biggest class you'll find anywhere."

Its popularity stems from the same rationale found in other forms of the sport where spec racing has found a foothold: It's an effective way to create an environment that rewards talent and tuning rather than out-spending the competition to snag a podium position.

This sealed motor has moved the focus away from the mechanical elements of the kart to a tangible degree in the class it's used in, but Smith noted that he has seen a similar shift across the board. "The biggest change I've noticed over the past decade or so is a transition from traditional brick-and-mortar shops to a 'race team support' business model," he explained. "Instead of going to a few different shops to mingle and source parts, now you're getting your stuff from a race team that's also supplying all of



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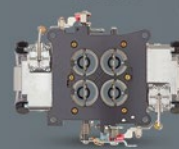
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## KARTING

the services that you would need—kind of an 'arrive and drive' type of situation. The teams are also providing coaching, data, and all the other elements required to make it a one-stop shop."

Meanwhile, Seesemann told us that there are some fundamental differences between how series in the United States and Europe operate. "You won't see the same type of 'spec' engines at the world championships in Italy. They have to be more or less built to the same 'spec,' but six different manufacturers make an engine for that, whereas here in the US each series has its own engine manufacturer that backs it."

It's a dynamic that speaks to a larger fragmentation of the sport that has developed here in United States.

"There are a lot of different organizations running events right now, which is not necessarily a good thing," said Zoeller. "As a number of different motorsport disciplines have discovered over the years, all you are really doing is taking the same pool of drivers and dividing them up into smaller groups. Having too many classes can be

*"THE TEAMS ARE ALSO PROVIDING COACHING, DATA, AND ALL THE OTHER ELEMENTS REQUIRED TO MAKE IT A ONE-STOP SHOP."*

problematic on some levels, too. I think the reason that the European drivers tend to be so much better is because there's a Junior class, a Senior class, a Shifter class, and that's it. Instead of dividing the pool of drivers into five different classes, like we do in the US, a lot of the kids who would have been put into different classes are running against each other, and it's collectively making them stronger competitors."

While opinions differ on the correct path forward, Roche said that interest in the sport is on the upswing. "There is definitely some Drive To Survive energy surrounding kart racing right now."



One factor that has helped karting grow in the US is a graduated class structure that allows young drivers to move up through the ranks by age group. "That structure makes the sport more approachable early on," said Dan Roche of Briggs & Stratton Racing.

The popular Netflix reality show chronicles the race seasons of various Formula 1 teams, and the drivers' roots in kart racing are often cited in both their development paths and their relationships with other F1 racers, many of whom originally met in karting series during their formative years.

"COVID-19 was also actually very good for karting," Roche added. "For a while it was one of the few things you could do that was socially distanced by nature, and many people looked at the downtime as an opportunity to check a few things off their bucket lists. It brought a surge of demand to our business."

## THE ROAD AHEAD

Social media, YouTube, and shows like Drive to Survive have helped to bring more visibility to karting, and the sport still remains one of the best options available for young drivers who're looking to get into wheel-to-wheel racing, but some are concerned that domestic fragmentation of the sport is hampering efforts to bring new competitors into karting.

"There really isn't a cohesive strategy at this point," Seesemann said. "Things like Facebook and race streaming help, but for the most part, people aren't going to 'stumble upon' karting in that way, so there has to be more of a concerted effort. One thing that surprises me is that you don't really



see these companies with booths at major NASCAR and IndyCar races and events like that. Costs and logistics are likely to be factors there. I think that if some of those series recognized that their customers came from karting and did a better job of reaching out to the sport to look into ways to provide these businesses with a space to advertise to those motorsport fans, it could have a meaningful impact." As it stands now, word-of-mouth remains the strongest driver of new interest in karting.

"Word-of-mouth has always been the most effective method for new people to find out about karting," said Smith. "CalSpeed, for example, used social media extensively for promotions, but it was largely word-of-mouth that got the job done. That seems to be the case for most organizations—one hardcore racer knows two other ones, and those two know three more between them, and it just keeps spreading from there as long as you have a good product. With social media you're casting a pretty wide net, and I think a more targeted approach—that is, going to places where you already have racing enthusiasts—is ultimately going to yield better results."

Looking down the road, organizers are also focused on adapting to a changing motorsports landscape.

"I definitely think that there's an electric power plant that is right for karting racing," said Roche. "The hurdle that we're facing right



By participating in the age-related class structure, drivers who started karting at age five and stayed with it until their mid-teens "could have potentially participated in four or five different classes," Briggs & Stratton's Dan Roche said. "That means you're always going to be competing against other drivers that are at your development level."






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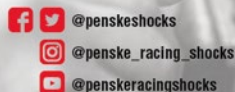


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## KARTING

# KARTING'S LADDER TO FORMULA 1

In only his first year of Formula 1 and having already earned two top-five finishes (as of press time), F1 driver and HP Tuners athlete Oscar Piastri attributes the racing skills he uses at each event on the worldwide racing stage to the disciplines he learned early on in his motorsports career with karting.

"I started karting when I was 10, and a lot of the lessons that I learned back then have helped me on the ladder up to Formula 1," Piastri told PRI. "There is no better way to learn the basics and fundamentals of racing."

He began his karting career in his home country of Australia. "Karting is where you learn your race craft, hone your skills, and get used to going wheel-to-wheel," he said. "It's also where you first start dealing with competition, and the emotions of winning and losing. It's obviously a lot rawer than Formula 1, but it's pure

racing, and you still have to be precise and accurate. It's a fantastic discipline to refine your skills."

Those skills he learned include overtaking competitors, braking at the right moments, finding the racing line, and more. "But away from the track," he added, "there is a great camaraderie amongst drivers, and that is a great community to be part of. It's old-school racing, and it is built on respect."

"It also educates drivers about all the other little things that nobody thinks of, like sponsorship and how to present yourself and conduct yourself in a professional manner."

"But more than anything, it is just great fun," he added.

In addition to his F1 driving duties, Piastri also serves as a global ambassador for HP Tuners, which he described as "a fantastic company that specializes in tuning and diagnostics in the aftermarket performance sector."



Oscar Piastri, currently driving in Formula 1, started racing karts at age 10. He believes "there is no better way to learn the basics and fundamentals of racing."



now is basically the same one that every EV interest has: infrastructure. Most kart tracks just don't have the facilities to support the power requirements, and bringing a portable generator to charge a battery to go racing just doesn't seem productive. I think there's an electric version of karting that's going to emerge fairly quickly, but the infrastructure requirements must be addressed in order to make it viable."

Seesemann also sees an opportunity for electric karting to make inroads in the future, after some of the early challenges are addressed. "Several companies are currently working on it, and they're facing the same obstacles we're seeing with EVs in other forms of motorsport in terms of trying to make it cheap enough, light enough, and charge fast enough."

But K1 has used electric karts at its indoor tracks for some time now, and Smith said the company is in the midst of developing a package that could see use in higher tiers of competition sooner rather than later.

"This kart offers speed that's comparable to the ROK VLR or IAME KA engines, which are the primary two 100cc packages that are available today," Smith explained. "Concerns about noise and EPA regulations may be driving a lot of this development, but I recently had a chance to drive one, and it's definitely a good time."

PRI

## SOURCES

**Briggs & Stratton Racing**  
basco.com

**Full Throttle Karting**

**HP Tuners**  
hptuners.com

**K1 Circuit**  
k1circuit.com

**Oscar Piastrì**  
oscarpiastrì.com

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scribnerplastics.com

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## FROM NEW MATERIALS TO ADVANCED COMPUTER SIMULATIONS, THE SCIENCE OF BRAKE SYSTEMS CONTINUES TO EVOLVE AND EXPAND, AS PART OF A NEVER-ENDING CYCLE IN WHICH THESE COMPONENTS REACT TO INCREASED SPEEDS AND CONTRIBUTE TO THOSE SPEEDS GOING EVEN HIGHER.

By David Bellm

**B**rakes are speed. While the rest of the world thinks of these vital components only as a way to slow down and stop, racers in most forms of motorsports also see them as a means of steering, transferring weight, and driving harder into corners. But what constitutes the ideal race-car brake system inevitably changes over time. New technologies, experimental setups, advanced materials, and revolutionary data systems are being applied to brake system development, bringing racers a range of options that are more effective than ever.

To get a handle on the latest developments in brake systems and components, we talked to leading manufacturers and suppliers. They gave us a deeply nuanced view of brakes, the science behind them, and what that means for racers.

### THE BIG PICTURE

One trend, more than perhaps any other, that has contributed to brake system development is that today's street cars carry much more weight and far more power. This

is particularly the case with production-based vehicles since many OEM performance-car platforms now tip the scale at well over two tons. At the same time, these behemoth machines are often making 500-plus horsepower right off the showroom floor, with modified cars routinely exceeding 1,000 hp. This combination of hefty mass and brutally strong power places extreme demands on brake systems.

"Many race cars are following the same trend that street cars are following—heavier and faster," said Paul Rankin of PFC Brakes, Clover, South Carolina. "This increases braking demand, so we are always looking at how to mitigate the heat most effectively. It's necessary to keep calipers and disc hats/disc bells cool, so we're designing in thermal barriers when necessary to help keep the heat in the disc, which is the primary heat sink of a braking system. But then we need to effectively manage the heat in the disc to help get it out of the system to keep the pads and discs in their optimal thermal window, so we don't see reduced performance or



# PERMISSION TO

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While Alcon has traditionally been known for being in high-price, low-volume sectors, "we're getting more involved with grassroots type series," said Phil Stubbs. "We're having a lot of success with that, be it road racing or oval track."

other thermal incidents. All of this must be accomplished without excess weight or too much system compliance, so it can be a delicate balance."

Manufacturers have also responded to this trend by producing new pads, with compounds that are better suited to quickly bring fast, heavy cars down from high velocities. "For years, our DTC-70 was our highest torque, highest temperature pad," said Edwin Mangune of Hawk Performance, Medina, Ohio. "But because race cars are making more power and are heavier, we realized we needed more brake torque than we currently had. So we produced our DTC-80, and now that's very successful."

In the quest to improve performance and respond to racers' continual needs for more effective brakes, manufacturers constantly look for new materials that can do the job better. "There are always new materials to

evaluate for any aspect of a brake system," said Rankin. "For aluminum components such as calipers or disc hats and disc bells, there's always a search for lighter and stiffer materials that can handle the thermal and mechanical stress. On brake discs, the iron can be tweaked with different alloys to tune the rotor properties for the environment which they will be subjected to."

In many cases, brake-system development is a collaborative process between brake manufacturers and racers. Such efforts typically begin as a theory based on observations and measurements. That can start with racers asking manufacturers to develop parts based on new ideas, or by manufacturers going to racers and asking them to try a new setup.

"A good example is a few years ago in NASA Spec E30," said Mangune. "Everyone was running our DTC-60 pad on the front axle and then our DTC-30 pads on the rear axle, so it was a staggered fitment, with the high-torque pad on the front. But after doing some testing with one of the regulars in that class and monitoring rotor temperatures, we felt he could use a higher torque pad on the rear. So we installed our DTC-70 pads on the

rear, which is about a half a step more brake torque than what the DTC-60 offers up front. And it made a big difference. Now, I don't think anybody uses the old combination anymore with DTC-30s on the rear axle."

## NEW MARKETS

Like any other business, brake component manufacturers are always on the lookout for new markets. With the constant ebb and flow of different types of motorsports in America, that tends to be a moving target.

Endurance racing has proven to be one of the healthiest markets for brake manufacturers in recent times, and all of the sources we spoke to point to it as an area of significant growth. The popularity of these series has opened up new possibilities for brake manufacturers, which are generally embracing the segment with open arms and bringing new technical developments to it. Foremost among the new brake products being made for endurance racing are advanced pads designed to withstand the rigors of long events, without requiring excessive brake-pad changeouts.

Traditionally, the US road race market focused on sprint racing, according to Mangune. "But in the last several years, endurance racing has become popular. So we developed our latest release, our ER-1 endurance race pad. We formulated it for grassroots endurance series, like ChampCar and Lucky Dog."

***"WITH ABS, DRIVERS ARE USING MORE OF THE BRAKE SYSTEM THROUGH THE APEX OF TURNS."***

While the need for longer-lasting pads is obvious in all types of endurance racing, this can come with tradeoffs. In particular, the traditional compromise with endurance pads is that they tend to gain longevity at the expense of initial bite. This typically requires pads to get several laps in them before they work effectively, requiring significant alteration in braking technique early in races.



Now, however, that's proving to be less the case, as manufacturers are finding ways to create brake pads that last for 12 hours or more while still having good initial bite. "When I was working with drivers on our ER-1 endurance pads, I told them to take it easy for the first lap or two because I didn't know how this pad comes on," said Mangune. "I had the dyno data, but that can be different in a real-world scenario. But when the drivers came back, they told me, 'These pads came on so strong that I just got on them right away.'"

Along with the developments in pad compounds, one of the most profound changes in endurance racing series has been the introduction of antilock braking systems (ABS). This has significantly altered the landscape of brake-system development. On the one hand, ABS has increased performance by giving racers relatively easy access to a much greater percentage of their car's ultimate braking



The trend to heavier and faster cars increases braking demand, said Paul Rankin of PFC, "so we're always looking at how to mitigate the heat most effectively. All this must be accomplished without excess weight or too much system compliance, so it can be a delicate balance."




capability. But it also has brought unique engineering challenges that manufacturers continue to grapple with.

"With ABS, drivers are using more of the brake system through the apex of turns," said Jim Emerson of PAGID Racing, Troy, Michigan. "In the old days, if you got a little bit of lock-up on the inside tire, you just backed off the brakes a little bit. But now they just drive it. So what happens is some of the less experienced drivers will just keep their foot to the floor and drive through the corner. But that means that the brake pad never comes off the disk—it never has a chance to breathe. So you have to be ready for thermal events over a period of time."

In terms of specific endurance-racing series, one of our sources noted that World Racing League (WRL) in particular is creating vast opportunities for brake manufacturers. As one of the most popular endurance racing series in the US, WRL's large number of participants, aggressive


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tires, and use of proven car platforms combine to make it an appealing market for brake manufacturers.

“What’s interesting about the WRL series is they’re on a 200-treadwear tire,” said Emerson. “They’re basically racing on slicks with treads. And because they run previous-generation cars, we have all the stuff. We have the tooling; we have the inventory already in the US. We know what works.”

One brake brand in particular is eyeing this and other similar grassroots series as a means of expanding market share

beyond its established clientele in the upper echelons of motorsports. “Traditionally, Alcon is known for being in high-price, low-volume sectors,” said Phil Stubbs of Alcon/Pro-System, Mooresville, North Carolina. “Now we’re getting more and more involved with grassroots type series. We’re having a lot of success with that, be it road racing or oval track. We’ve developed some products specifically for those cars that are working really well.”

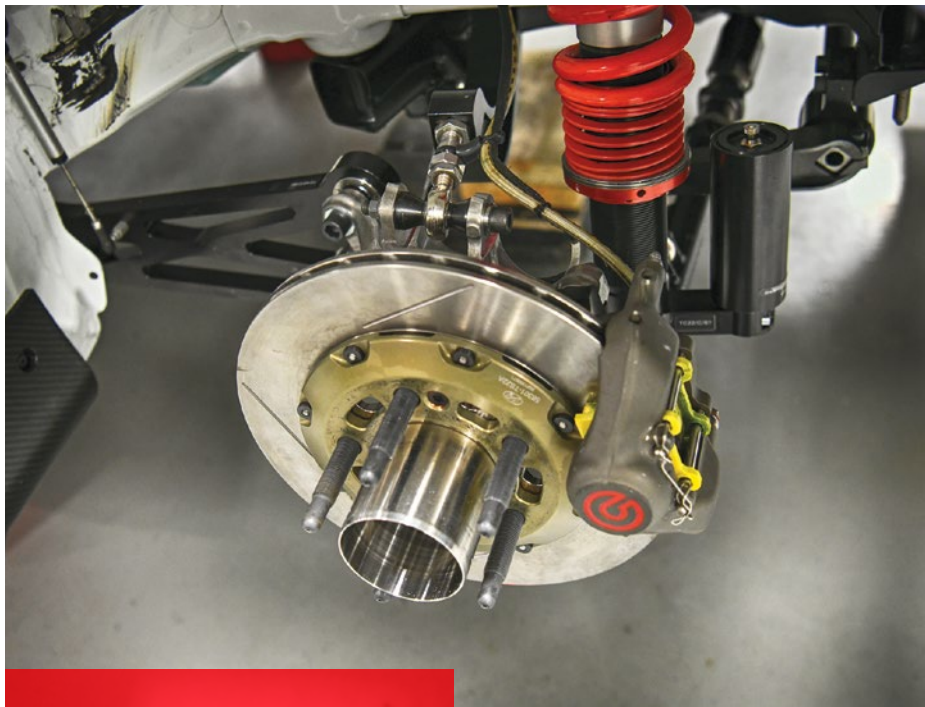
Along with more established forms of motorsports, all of the brake component

“Depending on the power of regenerative braking and the budget of the race series, changes in EV brake systems can be minimal or substantial,” said Rankin. “If a vehicle has limited or no regenerative braking, the brake system will remain largely unchanged. Of course, the system must be appropriately sized for the speed, weight, and brake power demands of the specific vehicle. But as more regenerative braking is added to the race car, we can start downsizing discs on the axles that are doing the regeneration, since the thermal load will not be as significant.

“On the brake-apply side of the system, the pedal and master cylinder may no longer be directly connected, in what’s called a brake-by-wire system,” continued Rankin. “This allows for brake blending to occur, where the first part of the brake pedal stroke does not engage the friction brakes but instead activates the regenerative braking—up to a point. At a certain level, the friction brake will engage to assist the motor regeneration. This is all computer controlled and, if well-programmed, it’s imperceptible to the driver.”

Alcon has been extensively involved with EV racing and continues to support it. However, Stubbs noted significant drawbacks that could limit the motorsports potential of EVs. “I don’t think EVs really lend themselves particularly well to racing right now, with their limited battery life,” he said. “So we’re not seeing a huge demand yet. It will probably come in time. Still, I think it’s going to be a while before EV racing is widespread. But we’re definitely involved. We were involved early on with Formula E, and we’ve been involved with electric rallycross cars. And we’ve developed our own brake-by-wire system.”

Although road racing is perhaps the most obvious motorsports segment for brake-system manufacturers to target, appealing opportunities are also coming from the off-road market, according to our sources. In particular, the side-by-side market has come on strong recently, bringing with it new potential for brake system development and new products that complement it. “We’re getting heavily into the off-road market right now,” said Dave Brzozowski of Wilwood,



While braking systems become increasingly more sophisticated, our sources also pointed out that many motorsports market segments remain highly price sensitive. Manufacturers must walk a fine line between creating the most effective, competitive parts, and keeping them at a price their intended market is willing to pay.

suppliers we spoke to are keeping a close eye on the electric-vehicle market. That said, they differ in how they’re approaching this emerging sector. Some manufacturers are preparing to dive in, while others are holding back and waiting to see how the scene develops. Regardless, all EVs present unique technical challenges for brake system manufacturers.



Camarillo, California. "Side-by-sides have taken off like wildfire, so that's really growing. Our biggest thing has been, of course, the calipers for them. And then we've added our lug drive rotor type system for those."

Other brake companies are taking a collaborative approach in pursuing the off-road market, fostering unique synergies that benefit both companies. "Several years ago, when I was tasked with the off-road market, I piggybacked with chassis builders," said Mangune. "I was looking for chassis builders to work with, and I found Jamar. At the time, they were one of the only ones that produced a full corner suspension that included the uprights and the brake system. For side-by-sides, they very recently did a full brake system that uses our pads."

## INCREASING SOPHISTICATION

As all forms of motorsports become more sophisticated and complex, brake manufacturers are keeping pace. Today's brake suppliers are increasingly taking a comprehensive view of their processes and their approach to problem solving. Among the many benefits of this are improved performance of products, greater cost competitiveness, and a wider range of components.

**"MANY RACE CARS ARE FOLLOWING THE SAME TREND THAT STREET CARS ARE FOLLOWING—HEAVIER AND FASTER."**

Alcon has shifted toward a systems approach instead of just focusing on individual components. This puts the company in charge of everything from pads to pedal box. OEM automakers favor this integrated-system approach, according to Stubbs. "We genuinely have control over the whole system," he said, "so we can do a better job, and it's a fully integrated package. Whether it's for the Ford Mustang GT3 or Aston Martin GT3, manufacturers prefer to



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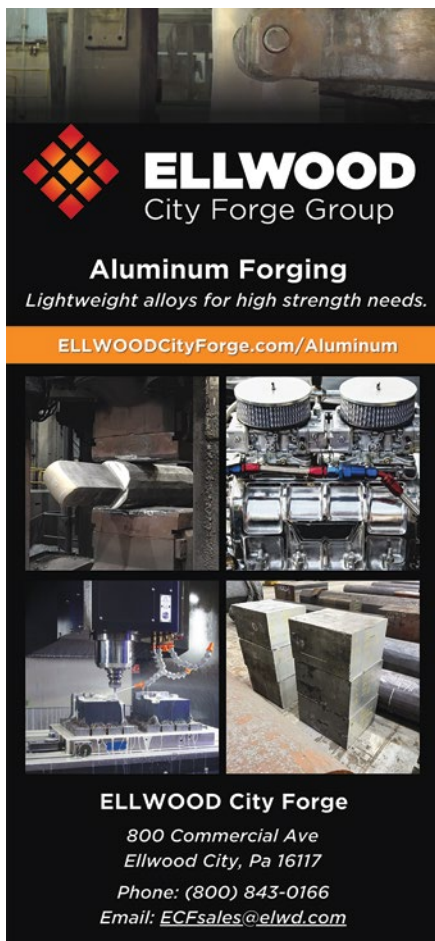


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get as much as they can from one supplier. They know it all works together. Troubleshooting is a lot easier. And during testing and development, they only have one company to deal with—there's no potential for finger pointing."

Complementing this approach is the move to more extensive simulation and data collection in brake development. "In the GT market, a lot of it now is coming down to repeatable simulation," said Emerson. "We're doing a lot of that, verifying braking characteristics with our dyno simulations to reproduce certain key tracks globally—Spa, Sebring, Nürburgring. The great thing about our team is we're so global that we have that ability to compare the results."

PFC is also doing extensive simulation and has developed a brake-rotor thermal simulation tool, which can predict rotor temperatures at any point on the track for any circuit used by IndyCar. At the same time, it can predict if changes to



There's always a search for lighter and stiffer materials that can handle the thermal and mechanical stress" of competition, said Paul Rankin of PFC. The iron in brake discs "can be tweaked with different alloys to tune the rotor properties for the environment they will be subjected to."

**"WE'RE VERY MUCH  
MOVING TOWARD  
DESIGN FOR  
MANUFACTURING."**

the car or brake system will affect brake rotor temperature. This has proven to be especially helpful with the carbon rotors and pads used in the series. "With carbon rotors and pads there's a temperature window," said Rankin. "If you aren't in this window, performance can drop off, so our rotor thermal simulation tool is effective in keeping the rotors in the ideal range."

For all this sophistication, our sources also pointed out that many motorsports market segments remain highly price sensitive. Manufacturers must walk a fine line between creating the most effective, competitive parts, and keeping them at a price their intended market is willing to pay. Because of this, the development process for brake components usually focuses on specific price points from the very start of the project.

One way manufacturers are keeping costs in check is by bringing as much of the manufacturing in-house as possible, thereby creating a more predictable flow of raw materials and limiting potential supply-chain challenges. "We do everything in-house,"



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said Brzozowski. "We're in complete control. So we aren't reliant on a lot of people, which is a game changer. We even went so far as bringing our anodizing in-house. We built our own type III anodizing facility, which isn't an easy process."

Another way brake manufacturers are controlling costs is by implementing design-for-manufacture processes, in which the design and development of components is driven from the start by how the part will be produced and what materials will go in it. This allows companies to maximize the inherent advantages of certain methods and materials, while minimizing the downsides.

"We're very much moving toward design for manufacturing," said Stubbs. "From the start, we're designing to make the manufacturing process as efficient as possible. That might mean, for example, that we're forging parts or casting them rather than machining them from solid billets. You can design the best, most exotic brake caliper, but if it's difficult to make, then it's not going to be very successful."

Whether it's in the form of new materials, new combinations of components, or the pursuit of new markets, manufacturers are forging promising developments in the science of braking. Regardless of where that journey takes them, the ultimate beneficiaries are racers, who get more choices of parts, improved components, and ultimately better results on track. **PRI**

## SOURCES

**Alcon/Pro-System**  
alconusa.com

**Hawk Performance**  
hawkperformance.com

**PAGID Racing**  
pagidracing.com

**PFC Brakes**  
pfcbrakes.com

**Wilwood**  
wilwood.com



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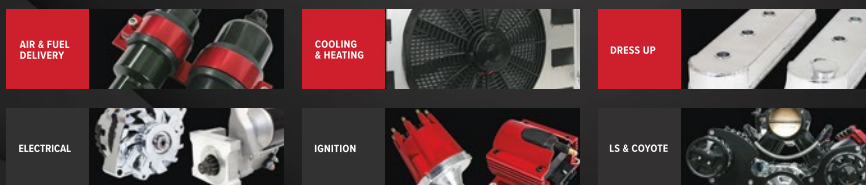
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# BEYOND THE HEARTBEAT







NEED TO REV UP YOUR  
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CRANKSHAFTS? CHECK OUT  
THESE TIPS, TRICKS, AND  
ADVICE FROM EXPERTS AT THE  
LEADING MANUFACTURERS  
AND SERVICE SHOPS.

By Mike Magda

In a poetic sense, a race engine's rhythmic pulse is generated by the crankshaft and its accompanying rotating components.

Seemingly simple in form but rather complex in function, the crankshaft can be a fractious topic among bench-racing circles. There are constant debates over material, construction, weight, balance, and more. Durability is always a goal, but so is freeing up horsepower. So, who has the answers?

The technical reps at crankshaft manufacturers and those companies that service crankshafts have heard all the questions and are happy to share their answers. They have stripped away the myths, analyzed the choices, and consulted with engineers to answer even the most academic and complicated questions posed by engine builders as well as weekend warriors.

The following is a sampling of some of the most-asked questions in addition to some of the more interesting queries directed at aftermarket crankshaft suppliers. There should be a revelation or two for even the most experienced racer who wants to know more about the engine's mechanical heartbeat.





There are many misconceptions about crankshaft balance, including one that a crankshaft is balanced "out of the box." Crankshafts are balanced only using the representative weight of the rotating components. All crankshafts must be balanced to a specific rod and piston combination. Photo courtesy of Late Model Engines.

**Q:** The most-asked question we usually get is, "What is the horsepower rating?"

**A:** Really, there is no such thing as a horsepower rating. The only time horsepower comes into play is if the crank breaks in the rear area, which sees the most torque. Most other times it's the lack of power that hurts a crankshaft; i.e. detonation is the number-one reason crankshafts get damaged. Next would be damage because of balancing issues, and lastly clearance mistakes.

—Kirk Peters, *Howards Cams, Oshkosh, Wisconsin*

**Q:** Why do some crankshafts have center counterweights?

**A:** Howards added center counterweights to strengthen our Billet Reaper line. By adding the center counterweights, we can reduce flex caused by torque and make the crankshaft easier to balance. When dealing with lightweight crankshafts, it's very important to use lightweight components to maximize the advantage of gaining higher and quicker rpm.

—Kirk Peters, *Howards Cams*

**Q:** What are the advantages and disadvantages of lightweight cranks?

**A:** A lighter crankshaft spins up quicker and lets you get back into your powerband quicker, which is great for circle-track applications. However, this advantage is also a disadvantage in other applications. Since momentum is a function of mass, this means that while you can spin up quicker, you will also lose rpm much faster, as well. For street builds and drag-strip applications, going too light on the crankshaft can be detrimental.

—Thomas Sheets, *Scat Crankshafts, Redondo Beach, California*

**Q:** Should I always choose a longer stroke?

**A:** While the adage "There is no replacement for displacement" is true, sometimes too much stroke isn't ideal for a build. A longer stroke certainly gives you more torque and more power, but if your heads don't have enough air flowing into the engine, that extra power is going to waste. If you're using power adders, you may not need a longer stroke, as the extra air generated by the power adders provides the boost in power. Finally, if you're going to have a high-revving engine, a longer stroke inhibits how fast you can spin the crank.

—Thomas Sheets, *Scat Crankshafts*

**Q:** Is a forged crank always better than a cast crank?

**A:** It is true that a forged crank will always be stronger than a cast steel crank. However, due to the grain structure present in a forging, sometimes it is overkill for a particular build. While the ratings vary based off the engine platform, cast cranks tend to be a couple of pounds lighter than forged cranks due to the density of forged steel. Basically, there is more meat per square inch in a forging. So, for street builds that are naturally aspirated, sometimes a cast crank may be the better choice.

—Thomas Sheets, *Scat Crankshafts*

**Q:** I've got a journal with a crack in it. Can it be repaired?

**A:** Sight unseen, it's hard to tell, but we have been able to repair a lot of journals with fractures in them. We basically grind out the crack, weld in fresh metal, refinish the journal, and heat-treat the crank. You should see some of the really ugly stuff we've been able to repair!

—Dave Olsen, *Mile High Crankshafts, Denver, Colorado*

**A:** In quite a few cases, a crack in a journal fillet or oil hole can be repaired. Diameter figures into how deep we will go, but we will carefully remove material where the crack resides and make a judgment call with the engine builder once it is taken care of.

—Nick Boes, *Shaftech, Findlay, Ohio*

**Q:** What are the challenges of repairing a crack in a journal?



**A:** If a fracture is long enough, chances are it's running pretty deep into the journal. But while trying to eliminate it, I can get to a point where I just don't feel like we've got enough base material left in the crank for strength. If a crack is more than .250- to .375-inch deep from the journal surface, I don't really feel like that can be a good repair for racing applications.

—Dave Olsen, Mile High Crankshafts

**Q:** How can you tell if a crack in a crankshaft is really trouble?

**A:** I recently worked on some old Ford Cosworth Indy cranks. They were museum pieces, so we weren't really concerned about the strength of the crank. I don't know if you're aware that a crank has a ring to it, kind of like a tuning fork when you tap it with

***“BY ADDING THE CENTER COUNTERWEIGHTS, WE CAN REDUCE FLEX CAUSED BY TORQUE AND MAKE THE CRANKSHAFT EASIER TO BALANCE.”***

a small hammer up and down. And if a crank has a bad enough crack, it will actually kill the ring. These particular Cosworth cranks sounded just like a brick. And I was really amazed when I finished repairing them that they rang beautifully again.

—Dave Olsen, Mile High Crankshafts

**Q:** Can you reshape a counterweight?

**A:** You can, but I don't do that type of work just because once a manufacturer has made a crank and it's gone through the heat-treating, it really gets hard to machine some of the surfaces without just destroying your lathe bits. We'll reduce the diameter of a crank, or if they want a little bit of a taper cut on one face of the counterweights, we can do that.

—Dave Olsen, Mile High Crankshafts

**A:** This can be done, but we don't get into that here. Between the abuse on tooling due



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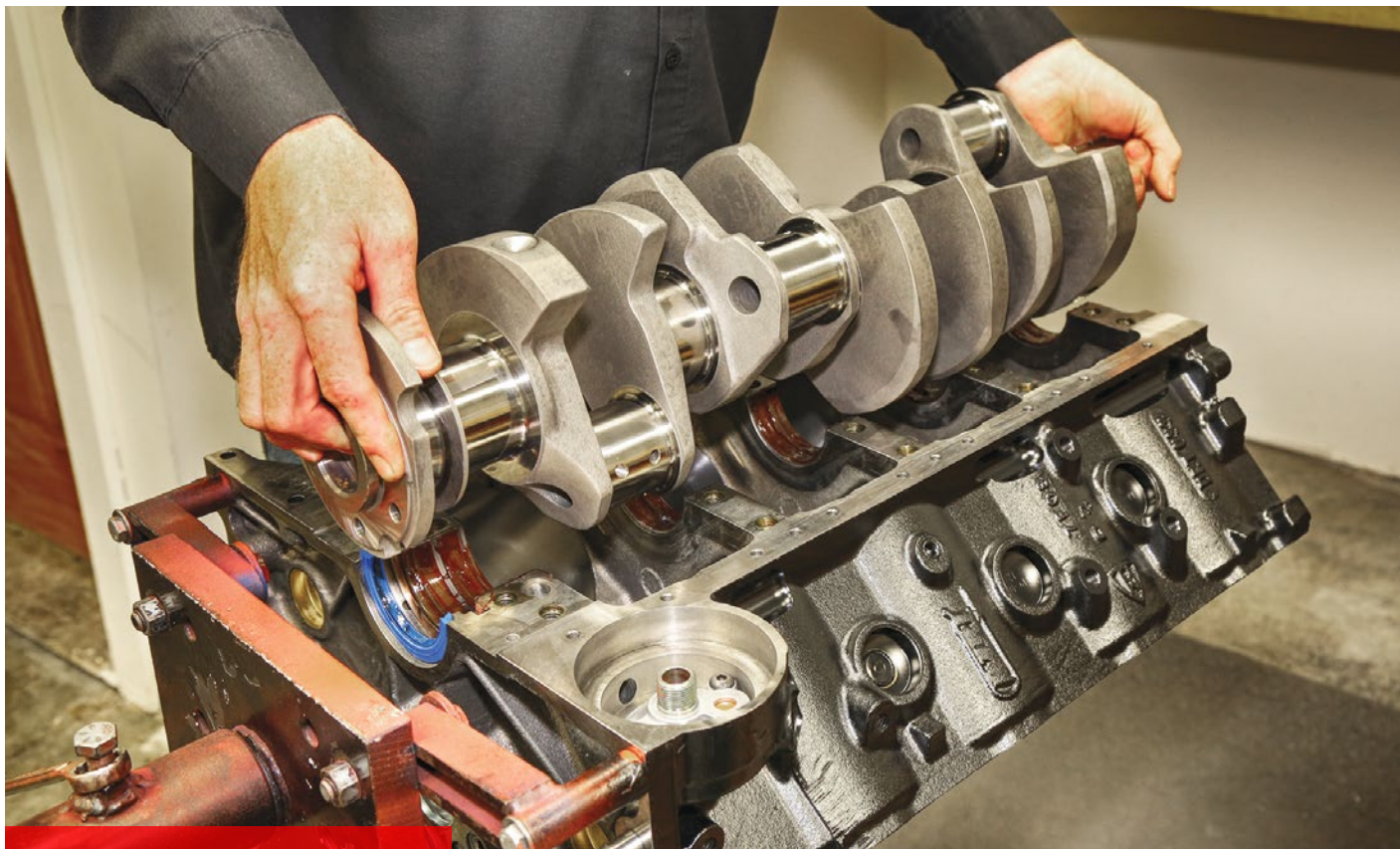
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to the counterweights already being nitrided and the further work then trying to re-balance the crankshaft, it's not something we have tried. Shaping counterweights will help with windage, but unless the whole assembly is getting lighter, it will make balancing the crankshaft a pretty expensive endeavor.

—Nick Boes, Shaftech

**Q:** How much stroke can you add?

**A:** This question does cause some confusion from time to time. When offset grinding, it's a 1:1 ratio. That is, for every .001 you remove from the diameter, you can move the stroke that same amount. Realistically we need to have a little bit of stock left over to make sure the journal rounds up at the end. But generally, we figure if we are grinding .100 off a crank, we can move the stroke .095 inch up or down.

The one area that may cause problems is how much material they have between the bearing diameter and the inside of the lightening hole that is usually drilled through the crankpin. If reducing stroke, this area may get too thin. Oil hole placement will sometimes cause a problem as well, depending on the amount somebody wants to add. Occasionally on special projects we

distortion, and softening of the core material. Many of your higher-end cranks use a thin nitride layer to provide a nice bearing surface, while the core material provides the strength and stiffness needed. This is why we re-nitride just about everything we grind here. By the time you remove .010-inch of material, the surface hardness has gone from high 50s HRC down to the high 40s. In

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will weld on half of a journal diameter in order to make large changes and still maintain the factory journal size. These can range from .250 up to 1.000 inch.

—Nick Boes, Shaftech

**Q:** Can you do extra-deep nitriding?

**A:** You can, but it generally comes with drawbacks, such as an increased compound zone (white layer), journal

most performance applications this will make quite a difference in how the crank performs over the remainder of its life.

—Nick Boes, Shaftech

**A:** We don't have such an option. There are different nitriding processes. Ion nitriding is only a few thousandths deep, but it's not like it goes in a few thousandths and stops. It's hard on the surface and sort of fades away. That's true with just about any kind



*"FOR STREET BUILDS AND DRAG-STRIP APPLICATIONS, GOING TOO LIGHT ON THE CRANKSHAFT CAN BE DETRIMENTAL."*

of nitriding. The other kinds of nitriding, like ammonia gas, can go deeper, but you run the risk of getting what's called the dreaded white layer, and that's where cracks can start. While it is more expensive, ion nitride is simply a better process.

—Tom Molnar, Molnar Technologies, Kentwood, Michigan

**Q:** How small of a main journal can you go?

**A:** Good question. You are mostly limited by the path the oil holes take and what bearings are available. It is common for us to grind .150- to .200-inch off main bearings to fit one type of crank into another block.

—Nick Boes, Shaftech

**Q:** How do you balance weight and strength?

**A:** It does come down to the lightest, strongest crank you can get. The best thing going for a crankshaft is smaller outside diameter. If you have a smaller outside diameter, there's less leverage working on the bearings, so your mains look much better. The design is generated by the stroke and bob weight, but there are limiting factors. With a bigger stroke, obviously you can't cut the counterweights down too far, unless you put in a bunch of heavy metal.

—Peter Harris, Crower Cams & Equipment, San Diego, California

**Q:** Is there a particular engine that is tougher to design crankshafts for?

**A:** Four-cylinders are probably harder on cranks because of the up-down-down-up configuration. They tend to vibrate if you get the crankshaft too light, so they're one of the hardest to get both lightweight and strong for the turbo guys.

—Peter Harris, Crower Cams & Equipment

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This photo from Scat Crankshafts compares a standard crankshaft (top) and one that has been lightened. Note how the counterweight has been scalloped. "A lighter crankshaft spins up quicker and lets you get back into your powerband quicker, which is great for circle-track applications," said Thomas Sheets.

on each rod pin. The higher the rpm, the higher those forces are. These forces are in the thousands of pounds and turn the crank into a piece of spaghetti. You need a counterweight opposite of those forces to reduce the bending. The key is getting the counterweights placed correctly to reduce that bending. If they're not placed correctly, you will see edge loading with the bearings and destroyed mains.

—Tom Molnar, Molnar Technologies

**Q:** Why is journal overlap so important?

**A:** An example of this: A number of years ago a customer asked me to make a LS crank with eight counterweights. He said he had a 4.500-inch stroke with 1.88-inch Honda rod journals, and he wanted eight counterweights because he kept taking out the mains and thought that would fix it. A crank with LS-size mains, 4.500-inch stroke, and Honda-size rod journals does not have any overlap keeping it together, and at high rpm, the forces bend the crank. There is simply nothing to keep it straight, and it destroys the main bearings. The larger the mains, larger the rod journals, the shorter the stroke, the stiffer the crank will be.

—Tom Molnar, Molnar Technologies

**"ALL CRANKSHAFTS MUST BE BALANCED TO YOUR SPECIFIC ROD AND PISTON COMBINATION."**

pistons and rods that are used with it. Since different rods and different pistons are different weights, it is impossible to make a crankshaft that out of the box is balanced to work with every rod and piston combination. All crankshafts must be balanced to your specific rod and piston combination.

When an Eagle crankshaft is listed as "internal balance" or "external balance," this is stating how this crank is intended to be balanced, not if the crank is balanced or not. A crank that is balanced internally uses a damper and flywheel that do not affect the balance of the crank. They have no weights on them and therefore do not contribute to the balancing of the crank. They are "neutral" or "internal." A crank that is externally balanced uses either a damper and/or flywheel with weights on them that contribute to the balancing of the crank.

**Q:** Is there a difference between billet and a forging?

**A:** We only make crankshafts out of 4340 steel here at Crower, so the forgings and the billets are the same material. We heat-treat them the same way, so they should be the same strength. The beauty of a billet is you can make it any shape you want, and you can increase overlap areas and really make a billet stronger just because you start with a blank canvas. With a forging, we've got certain guidelines and X amount of material.

—Peter Harris, Crower Cams & Equipment

**Q:** How do eight counterweights reduce crankshaft bending?

**A:** First, you could put a crank in a lathe, position a dial indicator in the middle of it, push on the crank with your thumb, and you can bend it slightly. That's true with all cranks. With any crank you have weight from the rods, piston, wrist pin, etc. pulling

**Q:** Please help me understand crankshaft balancing.

**A:** By far, the most common question we get regarding crankshafts has to do with balancing. People often misunderstand "internally balanced" as meaning the crank is already balanced out of the box. A crankshaft is not balanced by itself. A crankshaft is balanced to match the

Eight-counterweight crankshafts, such as this billet LS model from Molnar Technologies, can reduce crankshaft bending due to the forces pulling on each rod pin. The location and orientation of the center counterweights are crucial. "If they're not placed correctly, you will see edge loading with the bearings and destroyed mains," said Tom Molnar.





These components must be installed on the crank when the balancing is done. Some cranks are designed for a combination balance, meaning it will be internal in the front and external in the rear. A common example of this are one-piece rear-seal GM small and big block engines.

It is important to pay attention to how the crankshaft manufacturer intends its crank to be balanced. It may not be the same as OEM. A crank can be balanced otherwise, but it is much more difficult to do so. Eagle crankshafts are listed with a "target bobweight." This is an approximation (+/-2%) of the bobweight the crankshaft is roughly "out of the box." This is not intended to imply that the crank is balanced. It is simply provided so that the machine shop can more accurately predict what will be involved in balancing the crank so they can estimate balancing costs more accurately. Eagle crankshafts are designed to have a target bobweight higher than most typical rod and piston combinations. Therefore, in most cases, you will only need to remove material to balance the crankshaft instead of adding material, which can be expensive.

—Alan Davis, Eagle Specialty Products, Southaven, Mississippi **PRI**

## SOURCES

**Crower Cams & Equipment**  
crower.com

**Eagle Specialty Products**  
eaglerod.com

**Howards Cams**  
howardscams.com

**Mile High Crankshafts**  
milehighcranks.com

**Molnar Technologies**  
molnartechnologies.com

**Scat Enterprises**  
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# EFFICIENCY BY DESIGN

CLASS RULESETS OFTEN REQUIRE COMPROMISES IN THE COMBINATION, BUT ADVANCES IN DESIGN AND TUNING STRATEGIES ARE MAKING SUPERCHARGERS MORE EFFICIENT—AND MORE DURABLE—THAN EVER BEFORE.





By Bradley Iger

**A**lthough the concept of supercharging dates all the way back to the mid-1800s, engineers and competitors are still finding ways to improve this method of forced induction more than a century and a half later.

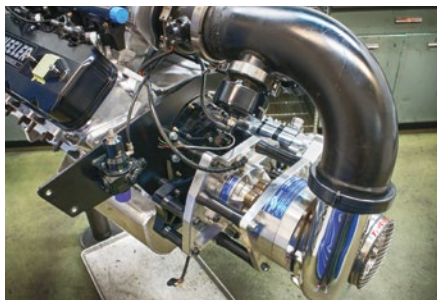
The demands of the application, the

specifics of a given class or series' ruleset, and the style of blower being used all come into play when determining where progress can be made, but there are a few elements that blower manufacturers generally keep at top-of-mind. Internal tolerances and aerodynamics have always played crucial roles in supercharger efficiency, and as more sophisticated technologies have been incorporated into

development, manufacturers are now able to pinpoint areas for improvement with a level of precision that just was not available a decade ago.

"Over the years, people found ways to get tighter and tighter clearances for sealing and things like that," explained Brad Littlefield of Littlefield Blowers, Rancho Cucamonga, California. "More recently, the focus has kind of shifted away from the tightness of the





A strict maintenance schedule can make a big difference in the longevity and performance of a blower. "Keep an eye on the run count and change the oil regularly," said ProCharger's Erik Radzins. "The teams that are winning championships are keeping track of everything, and that's why they're going round after round."

seal—you can only go so far with that. Now it's about how you can do that with minimal drag and better heat properties. And, in a general sense, a lot of that is about locating where it's necessary to have those tight clearances, and where you can open things up a bit. If you look at the blower on a Top Alcohol car from the early 1990s, at that time it was about making everything so tight that it takes a breaker bar to turn it even when it's sitting on the bench. For two or three runs they'd make incredible boost, then the performance would basically fall off a cliff. That's no longer the case with the way that they're designed now."

But there are also other factors, both in terms of a supercharger's design and how it's utilized out on the track, that play important roles in the performance it can deliver. More often than not, those same variables will also have a significant effect on the blower's overall longevity.

## DEMANDS OF THE TASK

Kim Pendergast of Magnuson Superchargers in Ventura, California, said that one of the main areas of development focus in recent years has been proper application sizing in displacements and pressure ratios that are not traditionally found in the automotive realm. "For example, the new TVS V180 is 10 times smaller than a traditional TVS1900 and capable of much higher pressure ratios," she said. "On the flip side, we also continue to develop large displacement units for bigger engines, whether that's a traditional gas-powered application or something that utilizes an alternative fuel. And we continue to develop the rotor design with Eaton, because what works best for a smaller unit doesn't necessarily scale linearly for the larger units."

Properly sizing a supercharger to a given

engine combination plays a fundamental role in its performance potential. But as Lance Keck of Vortech Superchargers in Channel Islands, California, pointed out, manufacturers and teams must often deviate from an ideal setup for a given application due to the limitations of class rulesets.

"We see it with all of the sanctioning bodies—they want to control the class with the power adder, and they typically go with a unit that's much too small for the application," Keck said. "When you do that, the supercharger runs into choke basically all of the time, and that elevates discharge temperatures dramatically. It's something we've had to contend with for years."

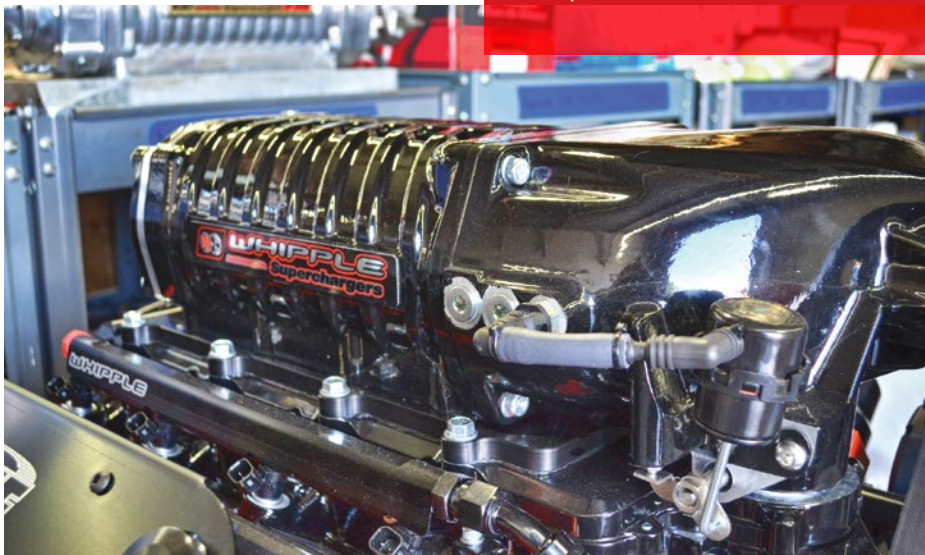
Littlefield said that while camshaft and cylinder head choice will also have a big impact on a blower's efficiency and durability in a given application, rule mandates related to other engine components can force teams to build their combinations around the specifics of that stipulation.

"Nostalgia Funny Car and Nostalgia Top Fuel are good examples of that because

they're limited to 6-71 blowers, and they also use what's essentially a 'spec' fuel pump in the class—they have to have a pump that's 20 gallons-per-minute at 8,000 rpm in the Top Fuel class, or 21 gallons-per-minute in the Funny Car class," Littlefield explained. "Because of that, you see teams playing more and more with the top openings. Some of those guys will reduce the top opening to three or four inches, even though it's kind of a no-no to shrink blower opening to the point where it won't perform well at a higher rpm. They do that because they're so limited by the fuel pump that a really efficient blower will otherwise just burn itself up and run away from the motor toward the end of a run. By shrinking that top opening, they're able to get to that boost early, and then have the blower kind of follow the engine curve a little bit better toward the top end."

But Erik Radzins of ProCharger in Lenexa, Kansas, noted that there's been some headway with sanctioning bodies on the subject. "One of the things I like about the PRI Show is that it's one of the few places where a guy like me can talk directly to

Properly sizing a supercharger to a given engine combination plays a fundamental role in its performance potential, though rule mandates related to other engine components can force teams to build their combinations around the specifics of that stipulation.





people who're on rule committees. Rule makers basically used to tell us how they wanted things like the blower gearbox to be designed—we'd make something new, and they wouldn't allow it. When I finally had the opportunity to have a conversation with one of them, I basically said, 'This is like telling everyone they can run your class and make 2,000 horsepower, but they have to use a 4L60 transmission. That means that the only teams that are going to win the class are the ones that have a dozen 4L60 transmissions sitting in a trailer.'"

*"WHEN YOU CAN IMPROVE THE EFFICIENCY OF THE COMPRESSOR STAGE, THERE'S LESS HEAT GENERATED FROM CREATING BOOST, AND THAT KEEPS THE GEARBOX SIDE OF THINGS COOLER."*

## DIALED-IN DESIGN

Supercharger manufacturers may face constraints in motorsports, but efforts to improve their products remain ongoing. "The compressor side has always been an area of concentration for us," said Keck of Vortech.

"With a really good compressor design, we can pick up efficiency as well as durability," he continued. "If we do a compressor design and it doesn't reach a 70% efficiency point, then we scratch that design and start over. We have an internal supercharger dyno that we use to develop compressor maps and do our testing with; we're one of the few supercharger companies that does that. When you can improve the efficiency of the compressor stage, there's less heat generated from creating boost, and that keeps the gearbox side of things cooler."

Meanwhile, Magnuson has recently added a custom-built test stand to its roster



of development equipment. Dubbed “Big Gulp,” it’s powered by a supercharged LT1 V8 engine from a seventh-generation Chevrolet Corvette. “Boy, does it make the blowers scream,” said Pendergast. “Its purpose is two-fold. Durability is obviously a big part of it, but it’s also about full-on performance. Having a gas engine power the blower lets us run and test in areas of the efficiency map that nobody has been capable of with an electrically driven test stand. We are truly pushing new limits of blower speed and boost pressure.”

By now, tools like CAD, computational fluid dynamics simulation, and 3D printing have become commonplace in supercharger development. But as is typically the case with technology, each new iteration of these tools provides a new level of sophistication. While that can enable designers to discover areas where there’s room for refinement in a design, Radzins said that it has also

*“THE NEW TVS V180 IS 10 TIMES SMALLER THAN A TRADITIONAL TVS1900 AND CAPABLE OF MUCH HIGHER PRESSURE RATIOS.”*

allowed ProCharger to take a more holistic development approach to the company’s products.

“For us, it comes down to blank-sheet engineering,” he explained. “For instance, when the F4X was designed, it didn’t share a single part with the F3. We could have tried to retain some stuff to help out with cost, but we wanted something that was purpose-built for what it needed to do.” That approach has extended out to system components that are produced outside of the company as well. “In the past, we had to use bearings that weren’t designed specifically for what we do with them. But due to the amount of bearings we’re using these days, we’ve established great relationships with these bearing companies. It’s to the point where they’re sending out engineers to see exactly what we’re doing with these things with their own eyes.”

Littlefield told us that a hard-anodized coating treatment is incorporated into its manufacturing process because it’s especially beneficial in applications where methanol or nitromethane fuels are being used. “It’s something we’ve always done with our high-performance blowers as kind of a first line of defense,” he explained. “It both strengthens the surface and reduces friction. It also reduces the potential for corrosion, which is always a plus.”

## CODE OF CONDUCT

Although advances in supercharger design have fundamentally elevated their performance potential and durability, Radzins said a greater understanding of best practices by end users has also had a profound effect. “Honestly, getting racers to understand the limitations of a blower has been the biggest help of all. At one point, everybody wanted to be John Force. They

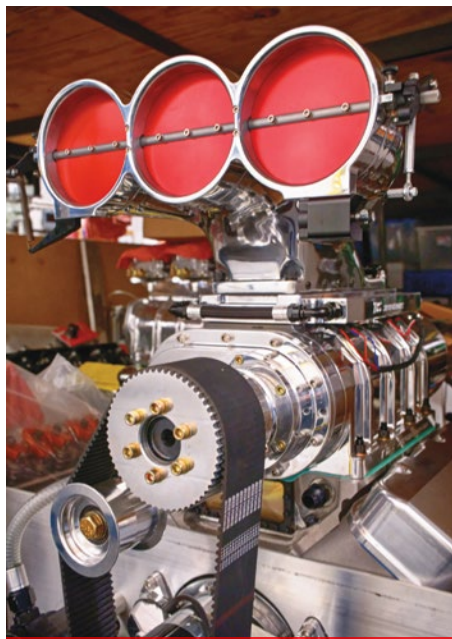
were doing burnouts at 8,000 rpm and just banging off of the rev limiter. That alone is incredibly stressful on the blower, and it kind of took a few years to get the word out. You’re creating a condition where the engine is at or near max rpm and beyond maximum load because it’s not making boost—it’s just moving air because the bypass valves are open. So you’re just shoving the compressor clean off of the map in one direction.”

Bad tuning habits have also been something of a sticking point for ProCharger. “If you’re battling a bad tune-up and you keep backfiring the motor without an intercooler in the equation, there’s no buffer involved. You have an impeller that’s trying to make boost, and you’re shoving a flame back through it in the wrong direction. Stuff like that is really hard on gearsets.”

To help combat the issue from a mechanical standpoint, ProCharger redesigned the blower gearbox as well as the system’s bypass valves. “We needed the bypass valves to operate quicker than anything that had ever been used in a supercharger,” Radzins continued. “We couldn’t do that until data logging sample rates reached a certain point. The resolution just wasn’t good enough to catch those pressure spikes.”

Keck said that ignition timing is another aspect where tuners can inadvertently cause supercharger damage. “Folks will go overboard on the amount of timing that the motor will accept. While they may not see it on the spark plug, when they start to detonate it, the crankshaft is going through harmonics, and it sends those harmonics through the gear drive directly into the supercharger. Suddenly the blower is dealing with those harmonics along with the harmonics that are inherent to the supercharger’s operation, and that makes the impeller shaft move in kind of an oval pattern. If the harmonics are bad enough, it will move the impeller shaft—along with the impeller—far enough that it will make contact with the volute. At that point it’s game over.”

Pendergast said that racers’ quest for more performance can sometimes send them in the opposite direction, too. “A lot of folks think they can improve our units by taking them apart, porting, changing oil



Internal tolerances and aerodynamics have always played crucial roles in supercharger efficiency. As more sophisticated technologies are incorporated into development, manufacturers can pinpoint areas for improvement with a level of precision that wasn’t available years ago.





"A lot of folks think they can improve our units by taking them apart, porting, changing oil types and fill rates," said Magnuson's Kim Pendergast. "You wouldn't believe how many used units we've improved by simply putting them back to our original specs."

types and fill rates," she explained. "You wouldn't believe how many used units we've improved by simply putting them back to our original specs. You really can't blame them; everyone wants to try new ideas and push the limits. But, at the end of the day, we're all after the same goals."

Outside of tuning and racer-initiated abuse, Radzins recommended sticking to a strict maintenance schedule, as that can make a world of difference in both longevity and performance of a blower. "Keep an eye on the run count and change the oil regularly," he advised. "The teams that are winning championships are putting checkmarks on the slicks, the valve covers, and the blower. They're keeping track of everything, and that's why they're going round after round." **PRI**

## SOURCES

**BDS Superchargers**  
blowerdriveservice.com

**Littlefield Blowers**  
facebook.com/littlefieldblowers/

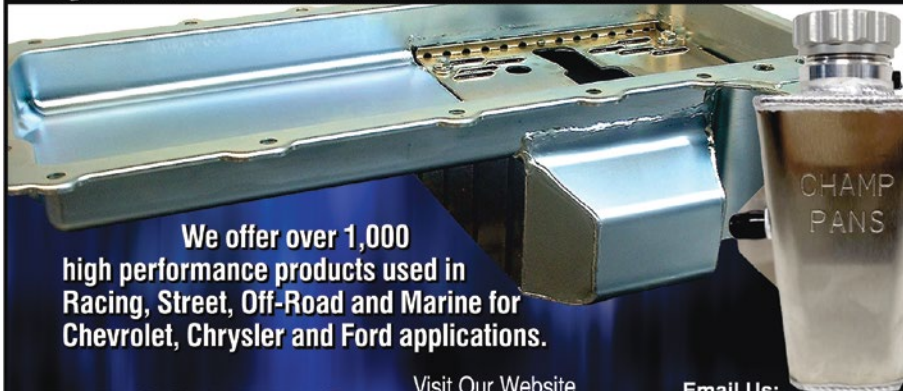
**Magnuson Superchargers**  
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# PRI TECH

## TRAILER PROTECTION

Follow these essential security measures to protect your trailer and its contents for ultimate peace of mind.

By Lyle Clark

In the world of motorsports and automotive enthusiasts, trailers are indispensable tools for transporting vehicles, equipment, and valuable cargo. Whether you're a professional racer, an avid collector, or a weekend hobbyist, the security of your trailer and its contents is of paramount importance. Unfortunately, many people make common mistakes when it comes to trailer security, leaving their precious cargo vulnerable to theft and damage. What follows is an examination of these pitfalls and valuable insights into the proper methods of safeguarding your trailer and its contents.

### 1. UNDERESTIMATING THE RISKS

One of the most significant mistakes trailer owners make is

***"ALARM SYSTEMS AND GPS TRACKING DEVICES ARE HIGHLY EFFECTIVE TOOLS TO SAFEGUARD YOUR TRAILER AND IMPROVE THE CHANCES OF RECOVERY IN CASE OF THEFT."***

underestimating the potential risks associated with trailer theft. They often assume that thieves will not target their trailers or that basic security measures are sufficient. However, trailers filled with valuable cars or equipment are highly attractive targets for criminals, especially when left unattended in

public areas or at events. Ignoring this risk can lead to devastating consequences and financial losses.

*What to do instead:* Understand the real risk involved and adopt a proactive mindset toward trailer security. Recognize that prevention is key and invest in comprehensive security measures to safeguard your trailer and its contents effectively.

### 2. LACK OF ADEQUATE LOCKING MECHANISMS

A common oversight is relying solely on the factory-installed locks or using generic padlocks, which can be easily defeated by determined thieves. These standard locks are often not strong enough to withstand sophisticated break-in attempts, leaving trailers vulnerable to theft and pilferage.

*What to do instead:* Upgrade your trailer's locking mechanisms to include heavy-duty padlocks, hitch locks, and wheel locks. Consider using reinforced steel chains or cables to secure the trailer to a fixed object, making it difficult for thieves to tow it away.

### 3. INADEQUATE LIGHTING AND VISIBILITY

Dark and poorly lit areas provide the perfect cover for thieves to tamper with your trailer unnoticed. Many trailer owners overlook the importance of proper lighting and visibility, making their trailers more susceptible to theft during nighttime or at events.

*What to do instead:* Install bright

Avoid common mistakes that can leave a trailer and its contents vulnerable to theft. A reliable locking mechanism, motion-activated floodlights, and an alarm are three practical tools to protect race trailers.





***“PREVENTION IS KEY AND INVEST IN COMPREHENSIVE SECURITY MEASURES TO SAFEGUARD YOUR TRAILER AND ITS CONTENTS EFFECTIVELY.”***

LED lights around your trailer to deter potential thieves. Position motion-activated floodlights near your trailer's entrance points to increase security during the night. Moreover, park your trailer in well-lit and high-traffic areas whenever possible, as thieves are less likely to strike in areas where they can be easily spotted.

#### **4. IGNORING ALARMS AND GPS TRACKING SYSTEMS**

Some trailer owners believe that theft prevention ends with a strong lock, but advanced security technology should not be overlooked. Alarm systems and GPS tracking devices are highly effective tools to safeguard your trailer and improve the chances of recovery in case of theft.

*What to do instead:* Invest in a high-quality trailer alarm system that triggers loud sirens and alerts your phone in case of unauthorized access. Consider installing GPS tracking devices that allow you to monitor your trailer's location in real-time. These tools significantly enhance the chances of retrieving your stolen trailer and its contents.

#### **5. LEAVING VALUABLES UNSECURED INSIDE THE TRAILER**

Leaving valuable items, such as tools, spare parts, or personal belongings, unsecured inside the trailer is a common mistake that can attract thieves. Even if the trailer is properly locked, looking through windows to visible valuable items can tempt burglars to break in and steal.

*What to do instead:* Always remove valuables from your trailer when it's not in use. If you must store items in the trailer

during transportation, use lockable storage containers or secure them to fixed anchor points within the trailer.

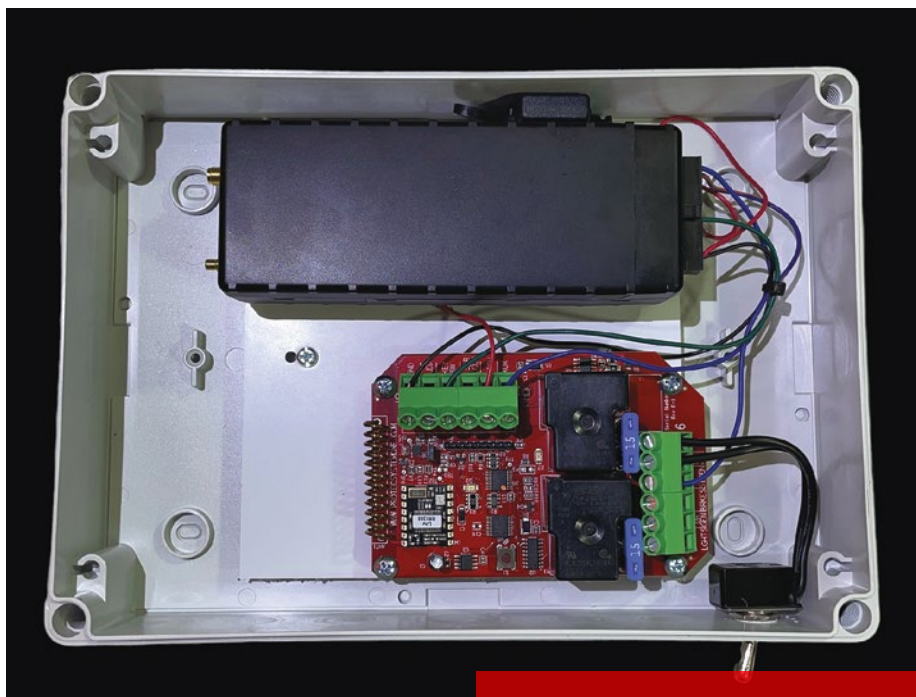
#### **6. FAILING TO CONDUCT REGULAR CHECKS**

Many trailer owners assume that once they've implemented security measures, their work is done. However, they forget that security requirements change over time, and equipment can wear out or become compromised.

*What to do instead:* Regularly inspect your trailer and its security features to ensure everything is in optimal working condition. Replace worn-out locks, update security software, and stay informed about the latest security technologies to keep your trailer protected.

#### **BE PROACTIVE**

Securing your trailer and its contents is not a one-time task; it requires continuous attention and proactive measures. By avoiding common security mistakes and adopting the right protective strategies, you can minimize the risk of theft and damage to your trailer and valuable cargo. Remember, investing in comprehensive security measures is a small price to pay for



Installing an alarm is an effective deterrent to prevent trailer theft. TrailerAlarms.com's PTS-2G, for example, not only provides "security in an instant" by sounding a 120 db siren, flashing the running lights of the trailer and locking the electric brakes, but it also allows the trailer owner to track its location, check the status, and remotely arm/disarm the alarm, as well as sends notifications via email if the alarm is set off.

the peace of mind that comes with knowing your prized possessions are safe and sound during every journey. Another benefit is you may even receive a discount from your insurance company. **PRI**

*Lyle Clark started Trailer-Alarms.com in 2005 after a friend's kart trailer had been broken into twice, prompting Clark to find better security solutions for racers. His goal was to become the JEGS for trailer security. In 2015, Clark purchased Pro-Tec System One, manufacturer of the PTS-2 trailer security system. Since then, the company has continued to expand the PTS-2 line as well as other products and is always testing new options and features.*



# ADVOCACY CORNER

Tracking legal, legislative, and regulatory developments impacting the racing and performance industry.

Edited by Laura Pitts

**P**RI's Washington, DC-based legal and advocacy teams work continuously to protect and support motorsports venues, sanctioning bodies, and businesses around the nation. We are tracking several initiatives this month, including new movement in legislation benefiting race track owners, four states' proposed bans on internal combustion engine (ICE) technology, and an update on how members of the industry came together to uplift the racing and automotive community.

## MOTORSPORTS FAIRNESS AND PERMANENCY ACT INTRODUCED INTO SENATE, GAINS INDUSTRY SUPPORT

US Senators Mark Warner (D-VA) and Todd Young (R-IN) have introduced S. 2462, the Motorsports Fairness and Permanency Act. The PRI-supported, bipartisan legislation would accelerate the time it takes for tracks to recover the cost of their long-term investments, such as facility upgrades and improvements. The Act would make permanent a seven-year cost recovery period for investments, an incentive currently set to expire at the end of 2025.

Companion legislation, H.R. 2696, was introduced earlier this year in the US House of Representatives by Representatives Claudia Tenney (R-NY) and Mike Thompson (D-CA), along with seven bipartisan co-sponsors. Motorsports facilities have benefited from accelerated cost recovery since 2004, when Congress codified a temporary provision that defined "motorsports entertainment complex." In 2020, Congress extended the accelerated depreciation of investments through December 2025. S. 2462 and H.R. 2696 would make the accelerated depreciation incentive permanent for more than 1,500 race tracks across the nation that have been the source of affordable, family-friendly entertainment for more than half a century.

"Most motorsports facilities are small businesses that employ many hard-working Americans and provide positive economic benefits to the surrounding communities they serve. Congress should make this provision permanent to all owners to make necessary investments to their tracks and property to ensure that racing continues to be available to enthusiasts nationwide," explained Tiffany Cipoletti, PRI Federal Government Affairs Manager.

The Motorsports Fairness and Permanency Act is gaining traction across the industry. Jonathan Byrd, the general manager of Indianapolis Speedrome, recently told WISH-TV Indianapolis about the paved short track's recent upgrades, including new concession stands, lighting, scoreboard, grandstands, and a beer garden. Byrd emphasized why the Motorsports Fairness and Permanency Act is essential, as at least six of his fellow track operators have been unable to reopen their gates this year.

PRI track ambassador Tom Deery echoed Byrd's sentiments to WISH-TV Indianapolis, stating that the tax break helps motorsports and entertainment facilities continually reinvent themselves to ensure the best customer experience.

For more information, contact Tiffany Cipoletti at [tiffanyc@sema.org](mailto:tiffanyc@sema.org).

## ACTION NEEDED: COLORADO, CONNECTICUT, MAINE, AND NEW JERSEY PROPOSE ICE BANS

Officials in Colorado, Connecticut, Maine, and New Jersey have published PRI- and SEMA-opposed regulations that, if approved, would require each state to adopt California's latest motor vehicle emissions laws. The moves would effectively outlaw the sale of new gas- and diesel-powered cars in those states beginning in 2035.

While Connecticut, Maine, and New Jersey have historically followed California's tailpipe laws, Colorado has recently flip-flopped on its stance. Once an advocate for individual choice in automobile purchases, the state is now pushing for an 80% zero-emissions vehicle (ZEV) mandate by 2032. This change in direction raises concerns about consumer choice, affordability, and the future of the automotive aftermarket industry.

"We believe that enthusiasts, not the government, should decide what vehicles are best for them and their families. Furthermore, the automotive industry is embracing new technology to make cars cleaner and more efficient, which includes hydrogen, new synthetic fuels, alternative fuels, and improvements to ICE technology," said Christian Robinson, PRI Senior Director, State Government Affairs & Grassroots. "Simply put, the government should allow the market to continue to innovate all forms of technology that significantly reduce vehicle emissions, not just electric vehicles."

Enthusiasts voiced their opposition to the regulations in comments submitted to state departments prior to press time. Submissions are now closed. PRI will continue to provide updates on these important initiatives.





Eric Bewersdorf, Reed Lubbers, Evan Belleville (front row) and Colin Belleville (back row) enjoy the PRI and SEMA PAC suite at the NASCAR Verizon 200 at the Brickyard.

For more information, contact Christian Robinson at [christianr@sema.org](mailto:christianr@sema.org).

## SEMA, PRI PACS RAISE THOUSANDS FOR THE INDUSTRY AT THE VERIZON BRICKYARD 200

On Sunday, August 13, the automotive industry witnessed exhilarating on-track action alongside a successful collaboration between PRI and SEMA Political Action Committees (PACs). The highly anticipated fundraiser, held during the NASCAR Verizon 200 at the Brickyard race, was a resounding success, bringing together industry leaders, local media, and passionate race enthusiasts for an unforgettable event.

Against the backdrop of the iconic Indianapolis Motor Speedway (IMS), nearly 50 PAC members, most of whom were first-time donors, raised more than \$14,000 to support our shared mission to advocate for the interests of the automotive aftermarket sector and racing communities.

US law restricts trade associations like SEMA and PRI from funding political candidates, but our voices still need to be heard. A PAC allows association members to pool resources and protect individual freedoms such as vehicle purchase choice, off-road access, and the right to race.

Keep an eye on the PRI eNews for upcoming PRI PAC fundraising events. For more information on how you can get involved in the PRI PAC, contact PAC Manager Alicia Steger at [alicias@sema.org](mailto:alicias@sema.org) or 202-796-2252. **PRI**

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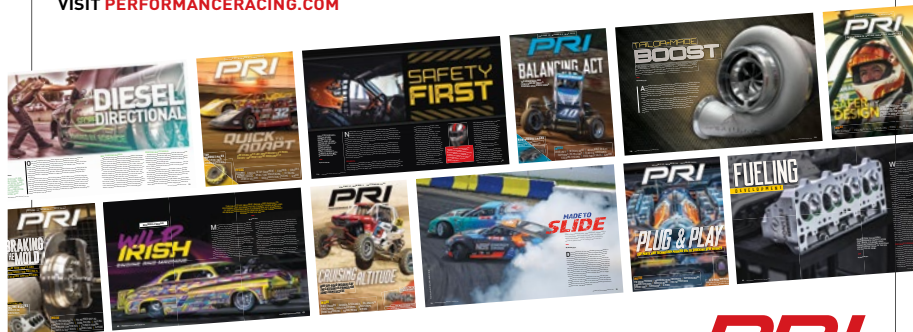
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## IRACING

[iracing.com](http://iracing.com)

World of Outlaws: Dirt Racing is the official video game of the WoO and now offers the 2023 Season Update for PlayStation 4, PlayStation 5, Xbox One, Xbox Series X, and Xbox Series S. The update adds the Xtreme Outlaw Midget Series presented by Toyota, three new tracks, and dozens of new paint schemes for the real-world stars of the WoO NOS Energy Sprint Car Series and Case Construction Late Model Series.

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# INDUSTRY NEWS

## BILL VUKOVICH II, 1968 INDIANAPOLIS 500 ROOKIE OF THE YEAR, 79

Bill Vukovich II, the 1968 Indianapolis 500 Rookie of the Year and member of one of the race's most prominent families, has passed away. He was 79.

Vukovich was the son of two-time Indianapolis 500 winner Bill Vukovich and the father of fellow Indianapolis 500 Rookie of the Year Billy Vukovich III. The California native made 12 starts in the 500 between 1968–1980, with six top-10 finishes. Vukovich also earned 23 USAC National Midget victories and was enshrined in the National Midget Auto Racing Hall of Fame in 1998, joining his father.

## MICKY RUPP, INDIANAPOLIS 500 VETERAN, DART KARTS CREATOR, 87

Micky Rupp, who started in the 1965 Indianapolis 500 and later gained acclaim as a successful entrepreneur, has passed away. He was 87.

Rupp, a native of Mansfield, Ohio, qualified 15th and finished sixth in the 500 in 1965. Rupp's Dart Karts became very popular and were produced through the late 1960s. Additionally, Rupp started multiple companies that specialized in manufacturing mini-bikes, snowmobiles, off-road vehicles, and sport fishing hardware.

## NASCAR ANNOUNCES HALL OF FAME CLASS OF 2024, LANDMARK AWARD

NASCAR has announced that Jimmie Johnson, Chad Knaus, and Donnie Allison will be the inductees for the NASCAR Hall of Fame Class of 2024—the 14th since the inception of the NASCAR Hall of Fame in 2010. In addition, Janet Guthrie was named the recipient of the Landmark Award for Outstanding Contributions to NASCAR.

The Class of 2024 Induction Ceremony is set for Friday, January 19, 2024, at the NASCAR Hall of Fame and Charlotte Convention Center in Charlotte, North Carolina.

## USAC ANNOUNCES 2023 HALL OF FAME CLASS

USAC officials have announced the 11th class of USAC Hall of Fame inductees, which features champion driver Bobby East; safety innovator Ted Halibrand; champion driver Tracy Hines; television producer Terry Lingner; vice president/general manager/editor Bill Marvel; and team owners and contributors, The Wilke Family.

## EXTREME E AND FIA ANNOUNCE PLANS FOR FIRST-EVER OFF-ROAD HYDROGEN RACING WORLD CHAMPIONSHIP

The Fédération Internationale de l'Automobile (FIA) and Extreme E have signed an agreement establishing a framework to create the first-ever hydrogen off-road racing world championship named Extreme H.

The series will become classified as an FIA championship beginning in 2025 and an FIA world championship in 2026—joining seven other official FIA World Championships. The Extreme H prototype is expected to launch later this year, ahead of the first season in 2025.

## iRACING AND FIA JOIN FORCES FOR FIA F4 ESPORTS REGIONAL TOUR

iRacing in Chelmsford, Massachusetts, and the FIA of Paris, France, announced the latest step in their collaboration centered around Formula 4: the iRacing FIA F4 Esports Regional Tour.

Introduced to iRacing for Season 4 in September, the new series adapts the regionally based real-world FIA F4 format to iRacing, with users able to compete in weekly races against other top open wheel racers from their region. The series will be broken up into four regions—two European regions, Americas, and Asia/Pacific.

## TRUCK SERIES' GMS RACING TO CLOSE AFTER 2023 SEASON

Officials with GMS Racing in Statesville, North Carolina, have announced it will cease operations at the conclusion of the 2023 race season. GMS Fabrication, a separate entity that has operated alongside the NASCAR Craftsman Truck Series (NCTS) race team, will also close its doors following the championship race at Phoenix Raceway.

GMS Racing, or as it was formerly known as Gallagher Motorsports, was founded by entrepreneur and CEO of Allegiant Travel Company, Maury Gallagher, in 2012. GMS Racing compiled two Truck championships, three ARCA championships and 68 wins as of press time. Gallagher is also a co-owner of the Legacy Motor Club in the NASCAR Cup Series.

## NASCAR TO PARTNER WITH NETFLIX FOR 2023 CUP PLAYOFFS DOCUMENTARY; INKS DEAL WITH THE CW NETWORK

Netflix, the subscription-based streaming service, has announced a new sports documentary series that will track the 2023 NASCAR Cup Series Playoffs and championship race.

The series will feature exclusive access to drivers and teams, exploring the physical and mental challenges of competing for a championship at the world's highest level of stock car racing. It is set to premiere on Netflix in early 2024 with five 45-minute episodes.

In related news, The CW Network will become the exclusive home to the NASCAR Xfinity Series beginning in 2025 and extending through the 2031 season.

The CW will broadcast 33 live NASCAR Xfinity Series races annually and practice and qualifying events each weekend. All NASCAR Xfinity Series races and ancillary content will be fully produced by the Emmy Award-winning NASCAR Productions group, in collaboration with The CW Network.



## TURN 14 TO ACQUIRE TUCKER POWERSPORTS

Turn 14 Distribution, the performance parts distributor based in Horsham, Pennsylvania, has announced that it will acquire Tucker Powersports, a 56-year-old powersports company based in Fort Worth, Texas.

Founded by Ed Tucker, Tucker Powersports also operates in Florida, Pennsylvania, Illinois, and California. Turn 14 Distribution will acquire its inventory, intellectual property, and private label brands, which include marques like Kuryakyn, Answer Racing, Pro Taper, and QuadBoss.

## GARRETT MOTION ADDS HOLLEY PERFORMANCE AS OFFICIAL PERFORMANCE DISTRIBUTOR FOR NORTH AMERICA

Garrett Motion—the global differentiated technology provider based in Plymouth, Michigan—has announced an expanded distribution channel through a new agreement with Holley Performance in Bowling Green, Kentucky.

This strategic relationship will allow Garrett Motion to strengthen its presence to better serve the performance enthusiast's needs, a company source stated. As part of the partnership, Holley will carry Garrett turbos, intercoolers, and wastegates, and provide support to customers.

## NASCAR ANNOUNCES PARTNERSHIPS WITH NVENUE, FANDUEL AND SPORTRADAR

NASCAR has announced partnerships with a trio of betting companies, including nVenue, FanDuel, and Sportradar.

The multi-year partnership with nVenue will develop in-race micro-betting markets and predictive content for race fans nationwide. FanDuel, the premier online gaming company in North America, announced a multi-year partnership that makes FanDuel an Authorized Gaming Operator of NASCAR. Additionally,

NASCAR and Sportradar announced a four-year extension of their long-term media data rights partnership, which now includes official betting data.

## RADFORD RACING SCHOOL ANNOUNCES MAJOR BUSINESS EXPANSION

Radford Racing School—the Chandler, Arizona-based driving and racing school—has announced a collaboration with the Wild Horse Pass Motorsports Park on the Gila River Indian Reservation in Chandler. The collaboration means Wild Horse's four permanent tracks will join Radford Racing School's existing offerings, with the entire complex now spanning more than 447 acres.

## PERTRONIX BRANDS BECOMES THE AEROMOTIVE GROUP

After acquiring Aeromotive Inc. and Waterman Racing Components in 2020, PerTronix Performance Brands has now become The Aeromotive Group. The move unites nine automotive brands—Aeromotive Fuel Systems, PerTronix Ignition Products, Taylor Cable, JBA Performance Exhaust, Doug's Headers, Patriot Exhaust, Waterman Racing Components, Compu-Fire, and Spyke—under one parent company, based in San Dimas, California.

## CUP SERIES' LEGACY MOTOR CLUB ANNOUNCES EXECUTIVE CHANGES

Legacy Motor Club (Legacy MC) CEO Cal Wells III has announced two key executive promotions within the NASCAR Cup Series team based out of Statesville, North Carolina.

Bill Scott, formerly executive vice president and general counsel of Legacy MC, has been named chief operating officer. He will oversee all the Club's business operations departments, including marketing, sales, human resources, licensing, and accounting. Additionally, Amy Walsh-Stock was promoted from director of communications to vice president, communications.

## WILWOOD ENGINEERING HIRES ROBERT HEMINGWAY AS DIRECTOR OF ENGINEERING

Wilwood Engineering—the Camarillo, California-based designer and manufacturer of high-performance disc brakes and components—has appointed Robert Hemingway as



Robert Hemingway

its new director of engineering.

Hemingway will join the R&D/engineering team and focus on Wilwood's ability to design and produce premium-quality brake components and systems utilizing the latest manufacturing and new material technologies.

## POWER AUTOMEDIA ADDS KEN BRUBAKER AS EDITOR OF ELECTRIFIED

Power Automedia in Temecula, California, has announced Ken Brubaker as the editor of Electrified, the new digital brand exclusively focused on electric vehicles (EVs) and all things EV-related.

Brubaker joins Power Automedia with experience in automotive journalism. Most recently, he has held the role of editor-in-chief of Four Wheeler at the Motor Trend Group.

## NASA APPOINTS MICHAEL DEARSTYNE AS 944 SPEC NATIONAL DIRECTOR

National Auto Sport Association (NASA) in Las Vegas, Nevada, has announced that NASA Southeast 944 Spec racer Michael Dearstyne has been named the new national director for the series. He replaces Dan Piña, who is leaving the role after eight years.

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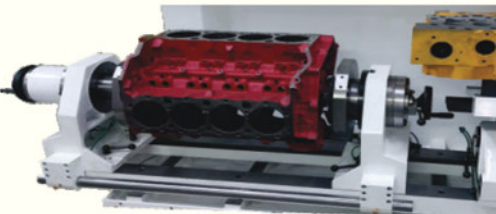
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# SOCIAL STATUS

Facebook Reels are a cost-effective opportunity to accelerate customer engagement and boost brand identity.

For the past few years, short-form vertical video has taken over social media. The trend started with TikTok, and then Instagram created Reels shortly after to directly compete. Reels quickly became Instagram's fastest growing content format. This prompted Meta (which owns and operates Facebook and Instagram) to bring Reels to Facebook as well, which has created major growth opportunities for users who have adapted to this change and put more emphasis on Reels.

Early adopters of Reels on Facebook have reaped the rewards as the algorithm has heavily weighted the feature, allowing content to get shared and highlighted more, which in turn offers more exposure and engagement as well as an increase in followers.

Facebook Reels is very similar to Instagram Reels with its editing capabilities, including music, voiceovers, filters, effects, stickers, and other tools. In fact, users can even create a Reel on Instagram and post it to both Instagram and Facebook Reels at the same time if their accounts are synced.

One of the biggest benefits of Facebook Reels is increased discoverability to a new audience. With Facebook's one billion monthly active social media users worldwide, businesses have a large

number of viewers to attract to their content, which turns into increased brand awareness and potentially more customers. If done well, brands can reach a large segment of their target audience and grow their following in a short amount of time.

Reels are public and get pushed out to everyone, not just your current followers or friends, but more specifically to those users who engage in similar content and topics as your industry. The algorithm picks up on users' viewing habits and continues to send them videos related to what they already enjoy watching. For example, there are millions of motorsports fans and gearheads globally, so if you're a racing business highlighting automotive-related content, your videos will be showcased to the many like-minded viewers out there. A majority of the users viewing your videos aren't yet followers, so posting to Reels gives you the chance to get your brand in front of them and convert them into followers, and then customers.

For the best results, here are some tips and best practices for Facebook Reels. Focus on quality content. Instant gratification is more prevalent than ever right now, so you must grab the audience's attention immediately or else they will scroll right by. Use content that's exciting, relatable, and/or inspiring. And keep it short. Attention spans have become

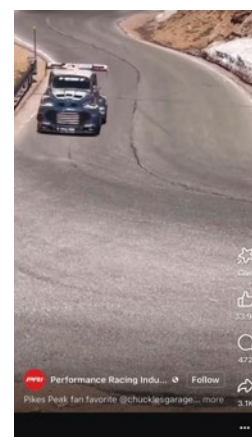
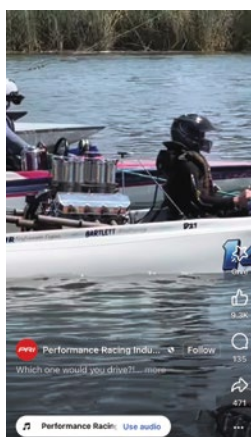
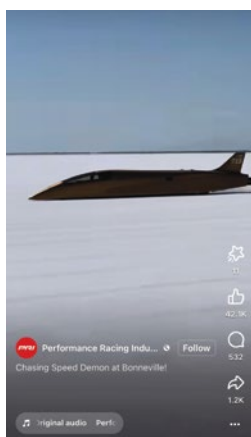
shorter, so a 10- to 15-second clip is the optimal length for Reels. Get creative, try new things, and don't get discouraged if an idea doesn't work. Not every video will go viral.

It's also important to keep in mind that you don't necessarily need professional camera equipment or top-notch video editing skills. High-quality videos can be captured on cell phones, and Reels offers several easy-to-use editing features directly through the app. If you don't have a team of professional videographers and editors, utilize those editing tools for best results and further reach.

Avoid low-resolution video, horizontal video, and videos with watermarks. This type of lower-quality content offers a less satisfying experience for viewers, which will result in the Reel being less discoverable on the app.

Facebook is one of the original social media platforms, which also makes it one of the largest from a user standpoint. Because of that, it's almost necessary for a business to utilize Facebook Reels, since it's currently the best way to reach the most people organically.

To sum it up, the most important reasons to start using Facebook Reels are to reach a wider audience, increase engagement, and increase brand awareness. Plus, it's a cost-effective way to reach our target audience. It's time to get creative! **PRI**



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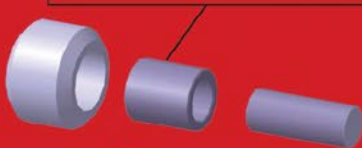


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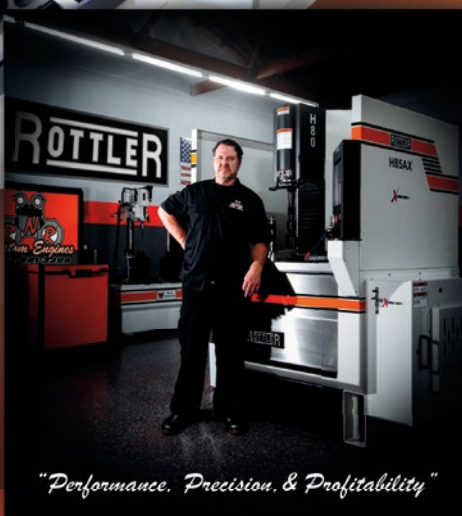
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