

scott r. lear photo



BREAK MAIDEN

Creating a Turbocharged AIX Champion From a Vintage Ford Mustang

story by scott r. lear • photos as credited

This classic Mustang has been reinvented as a NASA American Iron Extreme Champion. It now sports insane power thanks to a 410-cubic-inch engine fed by a backseat turbo.

In horse racing, any horse or rider who hasn't yet won a race is referred to as a maiden. To take that first career victory is to break maiden status. Just as in auto racing, such an accomplishment is a game changer. Suddenly, the odds shift and everyone else is gunning for you.

At the conclusion of the 2008 NASA Championships, Paul Faessler found himself with a big ol' bull's-eye on his back. Paul had just taken his first championship in the American Iron Extreme series, fending off previous champions Ernesto Roco and Chris Griswold for the coveted title.

The oddsmakers must have had a difficult time coming up with the figures prior to the race, too, as Paul's steed is fairly unconventional—even by AIX standards. Where most competitors in the class campaign late-model pony cars, Paul has gone old-school and runs a 1965 Mustang. Even the powerplant is a little unusual, as its 410-cubic-inch engine is fed by a turbocharger found where the back seat used to reside.

NASA's American Iron Extreme series gives domestic pony cars a place to run free. There are few restrictions in the class, so fat tires, insane power levels and very low curb weights are the rule. At the 2008 NASA Championships, the top three AIX cars turned fast laps about a second and a half off of the times turned by a full-whomp Daytona Prototype.

It's easy to attribute the low lap times of an AIX car to these power and mass factors, but don't forget the human element: It takes a brave and talented driver to wing such a high-performance contraption around a track at its very extreme limits of adhesion. As the lead designer and fabricator on this classic Mustang, Paul has demonstrated that he's savvy in the conceptual, wrenching and driving departments.

Horseplay

Paul's history with this particular Ford goes back several decades. "My friend Tim Mueller owned this car in the late '70s," he recalls. "We carpooled to the University of Cincinnati, where I earned my B.S. in mechanical engineering."

In the process of making some upgrades to the Mustang, Mueller discovered rust in the rear frame rails and decided to retire the car from daily use. In 1982, Paul—then a tooling engineer at General Motors—bought the Mustang, repaired the frame rails and started drag racing the car.

"It had been fitted with a built 351 Windsor," says Paul, referring to the V8 powerplant that was in the nose when he bought it. "The engine was actually built by my current and longtime employee, Tim Rovekamp."

In 1984, Paul left General Motors and opened his own tuning shop, Paul's Automotive Engineering. PAE focused on early Mustangs and Shelby Fords, and the 1965 Mustang became a showcase car for the business. "This car has always been a test bed for our workmanship and development projects," he explains.

Just a couple of years after PAE opened its doors, customers Patrick and Carol Lamy exposed Paul to the wonders of the road course. The Lamys campaigned a 1986 Ford Mustang with the TrackTime Driving School, and they persuaded Paul to bring his Mustang out for a dose of turning and braking to complement the fun of straight-line acceleration.

"That was the end of drag racing for this car," says Paul. He enthusiastically embraced his addiction to track driving, and the Mustang got a proper roll cage while retaining the full interior. "It was fun running basically a show car and beating a lot of race-prepared Porsches, BMWs and Vettes," he grins.

Off to the Races

By 2005, both Paul and the Mustang had accumulated more than a few miles of on-track experience, and the itch for competition began to take hold. "We decided to properly prepare the car for NASA's American Iron Vintage class," he says, "and for safety and weight's sake we gutted the interior and turned it into a real race car."

Unfortunately, 10 days before the inaugural NASA Championships event in 2006, officials determined that there weren't enough American Iron Vintage entries to constitute a class. Undeterred, Paul yanked the 15-inch wheels, threw on a set of 17x11-inchers with Kumho tires, fabricated some flares to accommodate the wider tires, and transferred to the American Iron Extreme class.

"We had too much power for American Iron," Paul says of the choice to run Extreme versus the regular AI class. "AIX was the draw, and I think it showcases our ability to custom-build things. Surprisingly, the car was competitive, and I was on the pole for the first NASA AIX Championship race even though the car was 400 pounds over [the minimum] weight."

Paul led the first lap of the race, and although he finished a number of laps down, the experience was habit-forming. "It was enough to make me start thinking about switching to AIX permanently," he recalls. "My son Brian and I discussed our options and agreed to go all out."

To the Extreme

To make the car competitive in AIX, a number of systems had to be completely reworked. The first order of business was to get the weight down, so Paul and Brian broke out the cutting wheels and let the sparks fly.

They removed excess metal from the roof's inner structure, the rear quarter panels and the rear seat supports; aluminum reinforcements were installed as necessary to retain structural integrity. "Gutting the door shells, that was a noticeable savings—about 15 pounds or more per door," Paul reports.

The Mustang already sported one of PAE's custom three-link rear suspensions, but they chopped out the front suspension and designed a double A-arm front setup with parts from the Hoerr Racing catalog. A Woodward rack-and-pinion steering setup helped to preserve the car's reasonable steering effort despite the wider Kumho tires.

"Due to time and money restraints, we just freshened up the old pump gas engine that had been in the car, untouched, since 1999," says Paul of the car's 410-cubic-inch Windsor engine. Power wasn't the only thing missing from the car at the 2007 championships, either—Paul was injured two weeks before the event and had to stay out of the driver's seat.

"I was horsing around with my son and I ended up with a couple of separated ribs—my fault," he muses. "Luckily, my good friend Tom Patton stepped into the car for the championship week and did a great job, finishing third with an underpowered car and brake problems."



OPPOSITE PAGE, FROM TOP

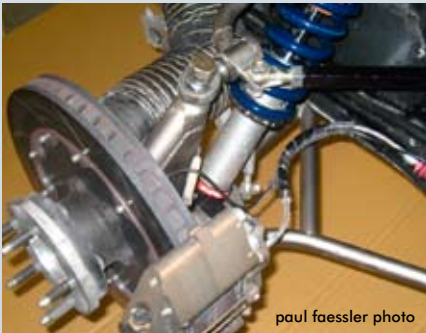
TO BOTTOM:

Paul Faessler's Mustang has a little surprise toward the back of the interior. See the thing that looks like a mailbox? There's a turbocharger in there. Before the compressed air is delivered to the engine compartment, it passes through an intercooler. The suspension is equally clever, featuring a custom A-arm setup built with parts sourced from Hoerr Racing. And accidents do happen. That scar on the rear fender is a testament to Paul's robust metal work.

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For the 2008 season, Paul decided that a turbocharger would be a great way to add power while also displaying PAE's engineering acumen. "We lowered our compression, changed the cam timing, and had Mike at Total Engine Airflow upgrade the valve seats in our Trick Flow Twisted Wedge R heads," Paul explains. "I built a set of 304 stainless steel headers and exhaust, and with longtime employee Greg Zach doing the fuel injection tuning on our chassis dyno, the combination exceeded our expectations at only 6 psi [of boost]."

Paul chose to locate the turbocharger outside of the engine bay primarily for weight distribution and packaging reasons: The turbo hardware took the place of a load of ballast. "I like a clean engine compartment; I didn't want all that weight in there and up high," he says. An air-to-water intercooler was installed where the passenger seat used to be.

Out of the Gate and Into the Books

Despite having run the car only twice with the turbo boost setup, Paul was enthusiastic about his chances when he arrived at Mid-Ohio for the 2008 Championships. "In the second practice session it ran a lap of 1:28.3—2.5 seconds faster than any of my competitors that day, and 1.3 seconds faster than any AIX car has ever run at Mid-Ohio," Paul proudly recalls.

A punt in one of the qualifying races left the car with a dinged-up fender flare and a bent wheel. The car survived the hit, and nobody was left doubting that the flares were indeed hand-fabricated metal. Paul was gridded third out of five AIX cars for the Sunday race.

"I took a much less aggressive approach from the start," says Paul. "I followed the previous champions for four laps. At that point I could see that we would be getting into lapped traffic soon, so I made my move and, within a lap, passed both cars for the lead. I was able pull a 6- to 7-second lead, which I maintained until a caution forced us to finish under yellow."

Paul's Mustang is the first AIX car to bring a turbocharger to the fore of the series. Naturally, the presence of something that can easily crank up power levels led to some fairly wild conjectures about just how many horses were under the hood.

"I never ran high boost; it was less than 7 psi," states Paul. "At the Nationals it made 610 [horsepower] at the wheels. We weren't making as much power as everybody thought we were." That said, Paul has stress tested the engine and claims it was able to produce 1000 horsepower on the PAE chassis dynamometer. "It's insane. We're building another setup just like it for a customer."

Paul has even bigger plans for the 2009 season. There's still room to play in the weight department, so the car is getting a new nose, a single-piece carbon fiber unit that will still allow the hood to open. "It should take 40 pounds off the nose of the car," he says. He's also planning to get creative with the turbocharger. "I think we'll get into some electronic controllers, a push-to-pass kind of a setup."

With the 2008 Championship title to its credit, Paul's Mustang is arguably the odds-on favorite to be a repeat winner. However, AIX has seen three different champions in as many years, so another competitor could break maiden and nab the title. Either way, it's reasonable to expect a few more turbocharged ponies appearing at the top echelon of AIX competition.



larry honegger photo

1965 Ford Mustang

owner:	Paul Faessler, 51, owner of Paul's Automotive Engineering
layout:	front engine, rear-wheel drive
engine:	410 cubic inch Ford Windsor V8 with rear-mount turbo, Eagle crankshaft and rods, CP pistons, Trick Flow Twisted Wedge R heads, valve seats custom ground by Total Engine Airflow, custom camshaft, 65 lb./hr. Precision Turbo injectors, Canton dry sump oil pan, MSD wires, MSD 7AL ignition, modified Edelbrock Super Victor Intake Manifold, Laminova oil cooler, Motorcraft oil filter, Ultra-Lube oil, Earl's lines and fittings, Paul's Automotive Engineering 3-in. stainless exhaust
driveline:	Quarter Master 3-disc clutch, Jerico NASCAR transmission with road course gearset, Detroit Locker 3.25:1 rear end
interior:	Paul's Automotive Engineering cage, Simpson belts, The Joie of Seating seat, Momo steering wheel, Tilton pedals, AIM Sports MXL Pista dash
exterior:	Paul's Automotive Engineering steel fender flares rear, plywood front splitter, carbon fiber hood and deck lid, G-Stream rear wing
suspension:	custom Paul's Automotive Engineering long double A-arm front suspension and 3-link rear, Koni 2812 monotube dampers front, Koni 30 Series dampers rear, custom Speedway Engineering anti-roll bars, Hypercoils springs, Woodward non-power rack-and-pinion steering
brakes:	14.0-in. Brembo discs and 4-piston calipers front, 12.8-in. Brembo discs and 4-piston calipers rear, Hawk DTC70 pads, 4-in. ducts front, Motul RBF 600 fluid
wheels:	18x11-in. Forgeline ZX3R
tires:	Kumho V710 305/30R18 front, 315/35R18 rear
numbers:	600 wheel horsepower (up to 1000 with increased boost), 600 lb.-ft. of torque, 2860 lbs. with driver
thanks:	Brian Faessler (crew chief), Tim Rovekamp (engine builder), Greg Zach (tuning and support), Dave Warren (friend and support), Maria Faessler (for putting up with all of this), Kumho Tires, Forgeline Wheels, Hawk Performance

LEFT: Paul's crew chief, Brian, also happens to be his son. Brian is working on his own American Iron license. **BELOW:** Vintage Mustangs weren't designed with regular trips at more than 120 mph in mind, so Faessler had to settle down the car by tweaking its aerodynamics. A large plywood splitter up front and the high-mounted G-Stream wing help stabilize the car.



chris clark photo