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about *Draco*.



TWIN ENGINES



THE SUPER-CHARGED PATEY BROTHERS
ARE FLYING FORCES OF NATURE

BY BETH E. STANTON

TWIN ENGINES

A

fascination with taking things apart and putting them back together began in infancy for identical twins Mike and Mark Patey, EAA 728914 and 728628, respectively. Their parents, Sharon and Ken, quickly learned that anything in the house was fair game for annihilation by their toddler sons. Rather than

telling them to stop taking the microwave apart or the back off the refrigerator, they nurtured their progeny's obsession with mechanical experimentation by buying them thrift store appliances to tear apart.

"We learned at an early age you can take things apart and mix them with other parts and make things really fun," Mike said. "When we figured out what a screwdriver was, the house was doomed."

By age 7, the boys were making electric-powered skateboards from vacuum cleaner motors. They learned welding, drivetrains, and gear systems. As they grew, they continued to mix and match parts in novel ways to see if they could create better go-karts, three-wheelers, motorbikes, and cars. Racing was the proving ground for their experiments, and they became enthralled with all kinds of racing — circle track, hill climb, desert motocross, drag, and the Baja 1000.

Growing up in a family of 11 children, they learned the value of hard work from a young age.

"We were poor, but my dad taught us all how to work and how to love working," Mike said. "He made sure we had fun and took pride in a job and to stop and say, 'Look what we just did. How cool is it that we built that?'"

The brothers started their first business at age 15 to pitch in and help family finances. Their construction company quickly grew, and they became serial entrepreneurs with many successful businesses in diverse fields, including electronic medical records, software, and engineering.

LEARNING TO FLY

AS TEENS, the boys built custom RC airplanes but had no drive toward pursuing aviation.

"Neither of us talked about big airplanes because financially it didn't seem like the real world to us," Mark said.

At age 24, learning to fly occurred to the brothers on the same day in a spooky stroke of synchronicity they casually refer to as "the twin thing." Mark was at Provo Municipal Airport in Utah looking at airplanes when he discovered that he could learn to fly in just a few months. Mark got excited and, within an hour, found a Cessna 172 on the field for sale. He was getting ready to call Mike with the news when his phone rang. Mike, on an impromptu trip with his father-in-law to an air show in California, suddenly decided that he and his brother should get their pilot certificates and buy an airplane.

"It was like for my whole life, aviation was in the dark," Mike said. "I never thought about it ever, and on this one day it was like I walked into a room and someone flipped the lights on. How did I not know that there is this whole world where you can just buy a bunch of parts and put them together and fly?"

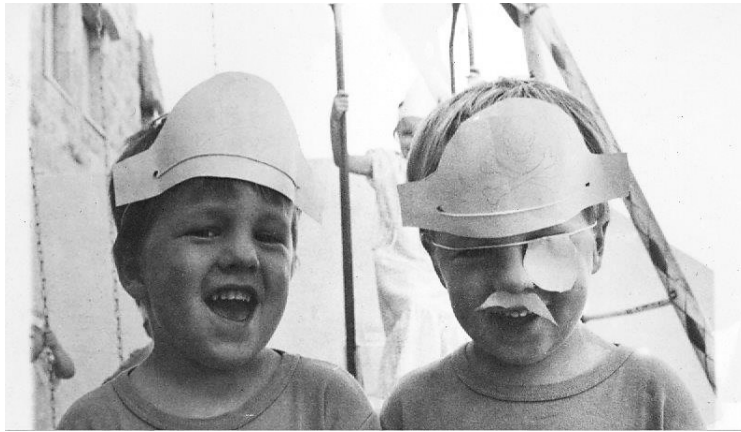
Mark said he and Mike have never been known to "dilly-dally."

"If we get an idea, we make a decision quick and move forward or not," Mark said.

Within a few months, they had their pilot certificates, and after a couple hundred hours of flying, they began building planes.

At the High Sierra Fly-In in October 2017, Mark Patey won the STOL drag race in his Best Tugs Carbon Cub. Mike Patey, holding the spinner of his Wilga says, "I'm going to put a turbine on it." In October 2018, Mike took the title and belt from Mark burning Jet A in Draco.





Top: No money for Halloween costumes, no problem – the twins make their own costumes.

Middle: Mike and Mark breaking the transcontinental world speed record with much of the flight flown in formation.

Bottom Left: Mike finishing the installation of a custom 720 Lycoming, now making more than 500 hp in his Lancair

Bottom Right: Mark working on Suzy Patey's plane thinking, "I want to put a 720 in it."

FAMILY ENTERPRISE

"MY HUSBAND IS ONE that has always done extreme sports and loves the adrenaline rush," Chandra Patey, EAA 1118535, said about Mike. "With flying, I thought he was going to learn how to do it, conquer it, and find something else. I could see it ignited something in him and that this hobby wasn't going away."

"I figured if I wanted to be where he was, I had to be interested in it, what he likes," Suzy Patey, EAA 1258546, said about her husband, Mark. "When it turned into airplanes, it was a whole new thing."

Both Chandra and Suzy earned their pilot certificates and, as their families grew to four kids each, flying and building airplanes became a family enterprise.

The first plane the brothers built was an RV-6 with little plans deviation other than a bigger engine and constant-speed propeller. Mark and the family built a Zenith 801 for backcountry flying as a birthday present for Suzy. The engine was underpowered for the 4,500-foot altitude at their home airport of Spanish Fork, Utah, which led to the brothers' first major modification – a custom-designed intercooled, turbocharged system that markedly increased the performance of the Zenith. They built an RV-10, a turbine Comp Air 8, an Epic LT, and then began building ever-higher-performing Lancair Legacys.

Risk is inherent with radical modifications, so they started out slowly and deliberately.

"I didn't build a national-winning hill climb champion machine the first round," Mike said. "I said let me do this one better, and then this one better. Then, when I got my feet underneath me, I said okay I understand this now. I'm going to jump out into left field and show the world what can be done if you stop thinking about little changes."

With their lifelong experience in engines, welding, and fabrication combined with newfound aeronautical knowledge, the brothers started pushing the envelope.

"It just got more and more fun every time," Mike said. "Aviation is a big giant wide-open play place. It's like Christmas, a candy store, and a white canvas all rolled up into one."

BUSINESS AND PLEASURE

AVIATION HAS BEEN integral to the Pateys' business success.

"With our software company, we found belly-to-belly meetings with clients were way more effective than over the phone," Mark said.

The brothers logged hundreds of hours a year flying to multiple appointments in different states each day.

"It allowed us to become the fastest growing company in that market space," he said. "I would argue that a lot of our success was due to the convenience of flight."

When Mark realized Suzy wasn't flying her plane much because she had difficulty moving it herself, he vowed to fix that problem. They had six tugs for eight aircraft in their hangar since certain tugs only worked on specific planes. Mark decided to build an all-digital smart "Tesla of tugs" for Suzy and, at the same time, build a company to teach his sons how to run a business. The business model for Best Tugs was to produce a premium tug that was 10 percent more money but twice the product.



The Pateys are quick to point out that The Flying Cowboys don't take a casual approach to flying. The twins and friends work the Tavaputs Ranch during the cattle drive.

Three years later, every month is a record month, and they are building as many tugs in a day as they had projected to build in a month.

"To be business partners with your kids is just amazing," Mark said, "I couldn't ask for anything more. It's a dream come true. People say aviation takes all your money. We say we're so passionate about aviation it's made us good at business because if we want the next cool airplane, we've got to work harder and smarter to get it. Yeah, aviation takes all our spare money, but aviation is what has motivated us [to] work so freaking hard from the very start."

Faster airplanes not only increased the number of clients they could reach in a day, but also could be used for racing. Mike had a twin turbo Continental TIO-550 six-cylinder engine in his Legacy, and Mark had a twin turbo Lycoming TIO-580 six-cylinder engine in his. They were racing in the Sport Air Racing League when they decided to attempt to set some world records.

TRANSCONTINENTAL SPEED RECORD

HOWARD HUGHES SET the transcontinental world speed record for the fastest single-engine internal combustion aircraft in 1937, crossing the country in seven hours and 28 minutes. Records stand for both eastbound and westbound routes, and the faster, more coveted eastbound route has a northern and southern route.

"You only get a certain window to break the record, and we were trying to wait for good tailwinds," Mark said.

A crosswind from Canada to the Gulf of Mexico prevailed as they got closer to the record attempt date. The brothers decided to stamp their name on the record by flying without a tailwind and attempting both the east to west routes to really knock it out of the ballpark.

They left San Diego on March 10, 2011, flying wingtip to wingtip until landing to refuel in Texas. Mike then flew to Charleston, South Carolina, to set the northern route record while Mark flew to Jacksonville, Florida, and set the southern record, both in just more than six hours. The following day, Mike flew from Jacksonville to San Diego in just more than eight and a half hours to set the west route record.

"It's a big deal, but everyone will always wonder when someone breaks a record how strong their tailwind was," Mark said.

They had a 7-knot crosswind average both directions. At the awards ceremony, the brothers received a standing ovation for their achievement.

MORE RECORDS

MARK WAS RUNNING undefeated in the Sport Air Racing League when he had an engine failure. He skillfully managed to land the plane using synthetic vision in instrument meteorological conditions. Wanting the horsepower of twin turbos but the reliability of a normally aspirated engine, the brothers replaced their engines.

Mike had an eight-cylinder supercharged Lycoming 780-cubic-inch engine, and Mark had a supercharged Lycoming 720-cubic-inch engine. Mark also began exploring the STOL envelope of bushplanes.

In the quest for even more speed, Mike continued to modify his Legacy. In the unlimited category, he finished the 2013 Sport Air Racing League season as the only undefeated racer, setting multiple track records. At the Mojave Experimental Fly-In in 2014, he broke speed records in the 1,000- and 2,000-kilometer courses with a top speed of 319 mph. The following year, he took second place in the AirVenture Cup Race and didn't like it. He came back in 2016 with *Turbulence*, a heavily modified Lancair Legacy and set a world record for the fastest single-engine turboprop with a speed of 438.02 mph. *Turbulence* has an 850-hp Pratt & Whitney PT6A-42 engine, custom five-blade MT propeller, and custom cowling, wings, and tail section. The entire fuselage is reinforced, and the airframe is 7 inches wider and 4 feet longer than a Legacy with a 32 percent larger rudder and tail.

Many planes are built solely for racing, but Mike wanted a plane that could not only be raced but also be used as a daily flyer. Custom wing and auxiliary fuel tanks carry 170 gallons of fuel with a 1,600 nm range at 380 knots. An infrared camera folds down from the wing that can see through clouds and weather and displays in the cockpit on three Garmin avionics glass screens. He flies *Turbulence* at the same power settings for traveling to meetings as he does for racing.

In another incidence of “the twin thing,” on opposite sides of the country and opposite ends of the flying spectrum, the brothers won two championships on the same day, one for fastest and one for slowest. On October 21, 2017, Mike won the Ghost Run Air Race in Texas and was inducted into the Sport Air Racing League Hall of Fame, while Mark became world STOL drag champion at the High Sierra Fly-In in Nevada.

PATEYS AT OSHKOSH

THE PATEY FAMILY annual pilgrimage to EAA AirVenture Oshkosh has been etched in stone on the calendar for the last 18 years.

“Every year this is our big vacation,” Mark said.

In the early years, the families would spend two weeks camping and dragging babies around in diapers and strollers.

“The best part of Oshkosh is after the show is over, hanging out and meeting people and being with the planes after the noise is done,” Mark said.

“Oshkosh for us is a giant family reunion of like-minded individuals,” Mike said. “It’s more than going and looking at airplanes. It’s just getting to hang out with all the friends we’ve met through aviation.”

Eight days before AirVenture 2018, Mike completed his latest project and flew it to Oshkosh. *Draco*, a beast of a bushplane, stole the show and drew awestruck crowds. *Draco* began life as a PZL Wilga but has been heavily modified into an experimental exhibition category aircraft. A 680-shp Pratt & Whitney PT6A-28 turboprop engine with a 102-inch, four-blade MT propeller powers *Draco*. The elevator and rudder were redesigned, and the wings made longer and wider. Wing fuel tank capacity was increased, and additional fuel is stored in landing gear leg tanks. It has 35-inch main gear tires, a custom tail wheel, and a sophisticated digital cockpit with autopilot, infrared night vision, and a backup camera.

WITH THEIR LIFELONG EXPERIENCE IN ENGINES, WELDING, AND FABRICATION COMBINED WITH NEWFOUND AERONAUTICAL KNOWLEDGE, THE BROTHERS STARTED PUSHING THE ENVELOPE.



Mike Patey shocks the EAA crowd with the arrival and demo flights of *Draco* during EAA AirVenture Oshkosh 2018. It was an amazing accomplishment especially considering it was only in 2016 that *Turbulence* 2.0, below, debuted at AirVenture beating the previous world speed record for single-engine turboprop. His official speed was 438.02 mph.



THE 2,500-POUND FOUR-SEATER takes off in 97 feet, lands in 110 feet, and has a 4,000 fpm climb rate with an approximately 35 mph stall speed. *Draco* debuted its incredible STOL capabilities at AirVenture's Twilight Flight Fest STOL competition.

Mike had chronicled the build and posted videos on social media. Thousands of people came up to him during the week to say they had followed along.

"It felt like my family of aviators was with me the whole way," he said.

His next plan for *Draco* is to outfit it with custom skis and attempt to set a world record for the highest elevation landing.

AIR THERAPY

"**MIKE AND I** are very driven, busy people," Mark said. "That kind of personality can burn out easily because we always feel the need to drive forward, not coast forward, but drive and push."

For the Patey brothers, getting into the air is like therapy.

"Once the wheels come off the ground you literally and figuratively disconnect from the planet," he said "Emotionally and mentally you are unplugged, and you take a big huge deep breath and life slows down. You don't need to do anything but enjoy the flight and be in that moment."

Mark's wife echoes his sentiment.

"Aviation for me is a sense of freedom," Suzy said. "When you're up flying, you don't have any responsibilities besides what's in front of you. When you're in the plane, you're just free to go places and see the country and the beauty everywhere."

"Mike runs 150 miles an hour everywhere he goes," Chandra said. "When we get in the planes and fly in the mountains he is completely relaxed and enjoying himself. I really enjoy that peace and quiet."

NEXT PLANES

PARTWAY THROUGH building *Draco*, Mike realized he wasn't going to have a project when he finished and went into panic mode.

"My next two planes I'm so excited about I can't even stand it," he said. "Right now, *Turbulence* is the fastest turboprop in the world, and I don't know of anything at its heels, so it might as well be me."

Mike is planning a pressurized racer of his own design (not based on a Lancair) with an increase in horsepower from 850 to 1,200.

He's also planning a tube and fabric bushplane and experimenting with unique ideas for suspension and power. He began designing it while building *Draco*.

"*Draco* is king of the hill for what it is, and that's crazy," Mike said. "I want to build one that my wife can fly that is more like a budget build that anyone could do."

He wants to make this bushplane capable of severely radical terrain where planes are not normally put down and to handle extreme rough landings.

BEAUTIFUL MINDS

THE MAJORITY OF the brothers' engineering expertise came not from time in school, but rather a real-world education motivated by the ambition to create entirely novel machines.

"When you read a book not to pass a grade but to bet your life on it, that's when the real education comes," Mark said. "The greatest education you'll ever get is the one driven by passion."

In addition to their engineering prowess, the brothers hold commercial, multiengine land and sea, and rotorcraft ratings.

"They push the limits and are like the modern-day *MythBusters* guys," Suzy said. "If they can prove something wrong or that it works better, they will figure it out. They always find a way to make it work. That's been their motto in engineering and new business ideas: There's got to be a way to make it work."

"Mike never tells himself 'I can't,'" Chandra said. "If there's something he wants to accomplish, he will figure out a way to do it. I do believe that some people are just born with certain talents and the natural ability to engineer things. His mind works in such a way that he can find different and creative ways to get to the goal. He is one that thinks way outside the box, and his way of creating is different and unique."

"DRACO IS KING OF THE HILL FOR WHAT IT IS"



NO HOLDING BACK

“**THEY HAVE A** unique relationship,” Suzy said. “They are both each other’s biggest cheerleaders, not just in aviation but in life. Their dad taught them to be excited with each other’s and everybody’s accomplishments. They honestly are not jealous of the other guy that won. They’re excited that he won and then go figure out a way to do better.”

The brothers not only excel but also revel in the multiple facets of aviation.

“It’s like very different groups of people all in the same family,” Mike said. “There is this backcountry group, high-speed race group, and the commercial aspect of aviation. I love to see what all of them are about and to find what it is about a certain group of people that makes them latch onto this aspect. If I don’t, I’ll feel like I’m missing out.”

Considering the extraordinary accomplishments of these indomitable brothers, it might be easy to forget their beginnings.

“It didn’t start with building *Draco*,” Mike said. “It started when I was broke and I wanted to build a go-kart, so I mowed more lawns. My dad said it doesn’t matter how broke you are, if you want that object, go earn the money. He taught us to take joy in a project and love it all the way along, no matter how difficult it got. If we can share that and help people understand that it’s just a decision and to go for it, that’s priceless. My parents taught us that there is nothing to hold you back.” *EAA*

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DRACO



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