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ZOOM ZOOM —

400mph, 50 feet up—what it takes to race and win world's fastest motorsport

It took just one moment for this pilot to realize he should be racing airplanes.

ERIC TEGLER - 8/30/2018, 10:25 AM



Andy Findlay, race pilot for the One Moment Air Race Team, poses with "Race 30," a highly modified 2004 Lancair "Super Legacy" (N115YP, L2K-143), at the Hampton Roads Executive Airport (KPVG) in Norfolk, Virginia

PHOTO 01 Aviation Photograph



In the summer of 2013, Andy Findlay found himself glancing down from the cockpit of his Lancair Super Legacy sport plane as he passed the start/finish pylon on the race course at Stead Airport, home of the Reno National Championship Air Races. Findlay was flying the famed Reno course for the first time. "It was one of those moments in life where you knew that was exactly where you were supposed to be," Findlay says.

The Reno Air Races are the only bastion of competitive airplane racing in the world. For 54 years, pilots have raced airplanes there around an oval track in the sky, 50 to 100 feet (15-30m) above the desert at up to 500mph (800km/h). There is *no* faster head-to-head motorsport.

Racing at Reno has long appealed to highly experienced, wealthy warbird owners and others with home-built airplanes. But now, the races are luring a younger group of pilots who are mixing piston-engined powerplants and analog aerodynamics with digitization. They race in the Sport class.



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One Moment

Most of the time you'll find Andrew (Andy) Findlay in Virginia Beach, Virginia where he works as an engineer for Stihl Tools. It's a long way from Reno but he grew up much closer, in McCall, Idaho. Andy first went to the Reno races with his father as a 15-year-old in the 1990s. Already a motorcycle and snowmobile racer, the teenager was inspired.

Ironically, one of the race pilots there was motocross racing legend, Bob "Hurricane" Hannah. Findlay still has the poster that Hannah signed for him. The similarity between flying and riding motorcycles (which he does regularly) has always fascinated the young engineer. Findlay went to college, got his private pilot's license and got a job. But the idea of air racing never left him. After a few years working

as an engineer, he decided to make his dream reality. "I put my house up for rent and lived with a buddy as cheaply as I could. I started saving money to dedicate everything I could to air racing," he told me.

The Sport class at Reno is made up of general aviation sport planes—Glasairs, Harmon Rockets, RV-4s, Thunder Mustangs, and Lancairs. A modern and cost-effective alternative to the top Unlimited class of largely ex-WWII fighters, the Sport class is where Findlay would direct his dedication. He found a damaged 2004 Lancair Super Legacy, a popular two-seat, low-wing sport plane. Powered by a six-cylinder, air-cooled, horizontally opposed Continental IO-550 (displacing 550 cubic inches, or 9.0L) with 310 horsepower (231kW) and a 3-blade Hartzell propeller, the Super Legacy has a top speed around 300mph (483km/h) at 8,000 feet (2,438m).

Findlay fixed the damage and convinced Reno race pilot and Lancair expert David Robinson to give him transition training in the Super Legacy, despite Findlay not having the 500 hours total flight time required to race at Reno. The training paid off. When Findlay showed up at Reno's Pylon Racing School (PRS)—where novices get race training—in June 2013, he flew the 7.91 mile (12.7km) course with race instructor Lee Behel, who let him do something few newbies are allowed. Behel had confidence enough in Findlay to allow him to make a mid-air pass. (All race passes are made on the outside of the airplane being overtaken.)

Making his first overtake on the race course as the two aircraft passed the start/finish pylon prompted Findlay to name his airplane *One Moment* in honor of that fleeting instant. In September of 2013, it would finally be time to race.

Super Legacy

At PRS, Findlay had lapped the race course in his stock Lancair at around 310mph (499km/h). That was fast, but not fast enough to keep him from potentially getting lapped by the *really* fast guys—people like Jeff LaVelle, who won in 2012 with a six-lap average of 393mph (632km/h) and later set a Sport class record at 409 mph (659km/h). Rookie or not, Andy didn't want to get lapped. "I worked at Evinrude and had a lot of engine development experience so it was game-on to try to make this thing go fast," he said.

In two and a half months, Andy and a volunteer crew added improved twin-turbochargers and water-methanol anti-detonation injection (ADI), allowing them to raise engine manifold pressure and boost. With significantly more power, Findlay qualified *One Moment* at 347.122mph (558.640km/h). He would race his way to fifth overall with a six-lap race average of 351.084mph (565.014km/h) and be nominated rookie of the year. He was never lapped.

Andy has returned to race every year since, achieving a best finish of third overall in 2015. He's progressively modified *One Moment*, now sponsored by Stihl Tools. Its Continental engine makes 750 horsepower (559kW)—more than twice the stock rating—thanks to a pair of custom Turbonetics 76mm turbochargers (one for each bank), sophisticated ADI, and a system which employs spray bars to spray coolant on the cylinders. The hot-rod IO-550 runs 75-plus inches of manifold pressure (3-bar of boost, or 25-30 PSI).

The engine is paired to a custom-designed McCauley Blackworks racing propeller. Smaller in diameter than the stock prop, it has been calibrated for blade-bend and also spins 200rpm faster (2700-

2900rpm). Aerodynamically, *One Moment's* airfoils and bodywork have been thoroughly smoothed, eliminating rough spots. The fuselage has been slightly widened behind the wing to keep airflow attached to the **empennage** (that is, the collective tail assembly).

A cockpit with digital engine management from Simple Digital Systems allows Andy to operate the fuel-injected engine without worrying about mixture or boost settings. Custom avionics from Dynon Skyview allow Findlay to see engine parameters, from water-methanol pressures to intake air temperature. The technology is impressive, and wide-open Sport class rules mean there's much more performance to be extracted from the airplanes which populate the race field. Still, it's the combination of pilot and preparation that wins races.

Fangs out

Air racing isn't like auto racing. If you blow your engine or lose a control surface, you can't just pull off the track. You have to land, and often, protect your own life. That's why the Reno air racing community is known as the "September Family." No matter how hard you race another pilot wingtip-to-wingtip, safety comes first. Every pilot relies on his crew and the other pilots and crews to a degree beyond most motorsports.

"In airplanes, rubbing's not racing," Andy observes. "To be flying that close to somebody around the course, you really have to truly trust those people. We practice a lot. But at the end of the day it *is* racing, so the fangs do come out. We're pushing the engines to the max. I've broken a couple. I'm pushing that throttle in as hard as I can and trying to catch the guy in front of me."

Findlay is shooting for a 400mph (644km/h) lap at this year's Reno Races in September, playing to win outright against 35 other Sport class race pilots. To do it, he'll have to get everything right in one moment.

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