

Maneuvering Room



Head over heels in the Sukhoi Su-29

By James Wynbrandt, Photos By James Lawrence

Thick mist billows in its wake like vaporized oil from a smoke system as the Niagara River tumbles over its namesake escarpment in a breathtaking aqueous Lomcevak. I catch occasional glimpses of the famed falls' plume as we mimic its thunderous mayhem a few miles and an ever-oscillating number of thousands of feet of altitude to the south. This must be what it's like going over the falls in a barrel—if the barrel had a radial engine and a big prop and pulled a lot of positive and negative G's. We're rolling and tumbling in a 1994 Sukhoi Su-29, the two-place trainer from the celebrated line of Russian aerobatic aircraft. Rick Volker (rvairshows.com), who flies a one-place Su-26 and a Supermarine Spitfire Mk 1X on the air show circuit, is demonstrating some of the qualities that brand Sukhois—in his opinion and by world aerobatic gold medal count—"the number-one unlimited category aircraft."

Since their competition debut in the 1986 World Aerobatic Championships, Sukhois have come to dominate international aerobatic competition. Though newer unlimited aerobatic aircraft have since appeared—e.g., the Extra 300LP, MX2, Edge 540 and CAP 232—Sukhois are still flown by the majority of world-class aerobats and win an outsized proportion of contests.

Volker puts the Su-29 through barrel and four-point rolls, snap rolls and split-Ss, loops and Immelmans, hammerheads and inverted flight.



He's taking it easy on me. These are sportsman- and intermediate-level maneuvers, inducing relatively light and brief G-loads. But Volker's control is precise and authoritative, and the Sukhoi's immediate response to quick control inputs borders on violent. In between the maneuvers, he's yanking us around to get in position for a photo ship. My gyros are getting scrambled pretty good, and by the time Volker turns the plane over to me after half

 an hour of flying, I can barely manage a Dutch roll before I'm too queasy to continue. We head back to Niagara Falls International (KIAG). I'll get another shot tomorrow.

The chance to fly a Sukhoi comes rarely. There aren't many of them to begin with—about 40 Su-29s in the United States, and another 30 or so worldwide. Moreover, they're licensed as experimental aircraft in the States; though impressively overbuilt, they were designed and produced without any regard for FAA standards. As experimentals, they can't be flown for hire, so you won't find any on the flight line at aerobatic schools, nor Sukhoi owners hawking flight time. (Demo flights for prospective buyers are permissible, and the direct costs of the flight can be charged.) Volker has graciously offered to take me up in the borrowed plane—with the owner's permission, of course.

Volker, trim and intense, is an inspiration to any late bloomer. He earned his pilot's license a dozen years ago at age 40, immersed himself in aerobatics and, two years later, bought this very Su-29, N229SU, upgrading from a Pitts S2B he had been flying in International Aerobatic Club competitions.

"I quickly advanced to do everything [the Pitts] could do, and I just wanted more," Volker had told me. "The Sukhoi was the bad boy in the world at the time. There was nothing close. I had to have it."

And when Volker had to have a single-place Su-26 to pursue air show work, a hangar neighbor at KIAG, John Wieckowski, who wanted an aerobatic aircraft, bought N2296.

"You think you're doing aerobatics until you fly this," Wieckowski, a retired physician, told me earlier that afternoon when we all met at his hangar. "I did not deserve one of the world's best aerobats at this point, but all of a sudden, Rick put it up for sale, and there it was."

Though their skill levels are different, both men often fly together, practicing maneuvers. In the one competition he has entered so far, Wieckowski took third-place Sportsman honors (out of a field of about 20). Both pilots give partial credit to the Sukhoi.

"The shape and profile of the aircraft lends itself to being easily visible from the ground at competition altitudes," Volker says, "making it easily gradable by competition judges."



Rick Volker is an International Aerobatic Club pilot in the unlimited category.



After earning his private license at 40, Rick Volker immersed himself in aerobatics and purchased this Su-29. Powered by a 360 hp, nine-cylinder, radial Vedeneyev M14P, the aircraft has adjustable metal shutters at the front of the cowl that offer manual engine-temperature control.

Competition is what Sukhoi aerobatic aircraft are all about. (The line includes the single-place Su-31, designed for freestyle, as opposed to compulsory, routines.) They were made for sanctioned competition, which must be performed in a 1,000-cubic-meter box. So despite the impressive power-to-weight ratio and climb and roll rates that Sukhois brought to aerobatics, what distinguishes them is their slow-speed handling capability. Unlike competitors, Sukhois maintain their responsiveness at low airspeeds, a distinct advantage when operating in such a confined space during an aerobatic sequence. In other words, the aircraft gives pilots maneuvering room.

Developed by a team led by noted aerobatic aircraft designer Slava Kondratiev at the Sukhoi Design Bureau, which created the Soviet Union's finest fighter aircraft, one of the project's primary goals was to demonstrate the use of composite material in aircraft construction. The Sukhoi was the first aerobatic aircraft composed primarily of composites (about 60% by weight). But they were also designed for Soviet pilots to fly in international competition during the Cold War, and no expense was spared in making them as capable as possible. You can't help thinking of Dolph Lundgren going against Sylvester Stallone in Rocky IV as you do the walkaround inspection, marveling at the muscular, overbuilt airframe.

In the late 1980s, when the Soviets decided to make and sell production versions through an independent company, Advanced Sukhoi Technologies, they asked Richard Goode (www.russianaeros.com), an English pilot who had previously bought Yakelov aircraft from them, to act as sales representative. Today, Goode is acknowledged as one of the foremost

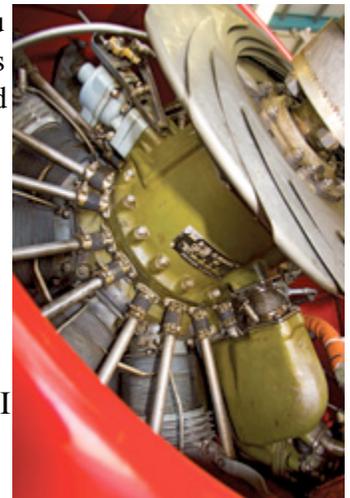
authorities on the aircraft, and though production of new Sukhois ended earlier this decade, he's the only person in the world who regularly buys, sells and refurbishes them.

"It was designed and made without any regard to cost," Goode tells me. "If you look at its construction—carbon fiber, Kevlar, titanium and magnesium—it was designed and made in a way that would make no economic sense. No one could afford to do that. The price [about \$185,000 when introduced] never reflected the real cost." (Brian Becker, of the now-closed Pompano Air Center in Pompano Beach, Fla.—where I previously flew an Su-29—was the only other Sukhoi dealer outside the Soviet Union.)

But a pilot needed to fly with someone who really knew the airplane to exploit its full potential, hence the two-place version, introduced in 1991. I was eager to exploit just some of its capabilities, and with a clear head the following day, I returned to the airport to fly with Wieckowski.

Born in Poland, the son of a flight instructor, Wieckowski began glider lessons at age 16, after an initial delay.

"My father didn't want me to fly," Wieckowski explains. "That's how I came upon my first aerobatic flight. He had a Zlin, and he said that if he takes me for an aerobatic flight and I still want to fly..." Wieckowski smiles. "He took me in it, and I had the best time of my life. That's how I started flying."





The Sukhoi Su-29's cockpit features seat backs that are canted back about 50 degrees, enabling blood flow to the brain and reducing the risk of grayouts during high-G maneuvers. All of the instruments and gauges (with the exception of the altimeter) provide readouts in metrics.

can get scrambled just looking at the panel. The placards are written with Cyrillic characters, and the instruments and gauges provide readouts in metrics. Only the altimeter has been changed to a conventional (by U.S. standards) instrument registering altitude in feet.

Instead of a big battery, the Sukhoi uses a self-charging onboard air compressor to start the engine. There's no key. Prime it, hit the start button, and compressed air turns the prop, and a small battery provides a shower of sparks to ignite the internal combustion. Hot or cold, the Vedeneyev almost always starts right up. As soon as it kicks over, turn on the magnetos. In case you didn't notice, the prop is spinning counterclockwise when viewed from the cockpit, opposite the rotational direction of almost all U.S.-built engines.



Vision over the nose is limited, requiring constant S-turns while taxiing. Cleared for takeoff, we take 28L. Because of the prop's directional rotation, left (rather than right) rudder is applied on the takeoff roll to compensate for the P-factor.



Sukhois take off and land from a three-point stance. At about 120 kph (75 mph), with the stick neutral, the Sukhoi flies itself off the ground. Once in the air, use a little forward pressure to build the airspeed up to about 170 kph (106 mph), and then resume the climb. We head to the practice area over Grand Island, just north of the airport, and level at 2,000 feet.

With Wieckowski talking me through, we do loops, rolls, Cuban 8s, hammerheads and inverted and knife-edge flight. The midmounted wings have no dihedral, so Sukhois fly much the same whether upside down or right side up. Meanwhile, the big prop lets a Sukhoi practically hover when it's pointed straight up, and acts like an air brake when pointed down. At the other end of the plane, the big rudder boosts the low-air-speed responsiveness. As for structural

The red and white Sukhoi is in front of the hangar, leaving an empty space next to Wieckowski's C-180. It stands high off the ground on a pair of gear legs fashioned from a single bowed piece of titanium alloy steel, providing clearance for the 100-inch-diameter arc of the three-blade, composite MT-Propeller. Radial engines may be considered relics in the West, but Russia continues to produce exemplary round engines, such as the 360 hp, nine-cylinder Vedeneyev M14P that powers the Su-29. Adjustable metal shutters that can open and close like the aperture of a camera are positioned at the front of the cowl for manual engine-temperature control.

Climb up onto the left wing for entry into the cockpit. The canopy is hinged on the right side. The seat backs are canted back about 50 degrees on an Su-29, making it easier to keep blood flowing to the brain and reducing the risk of grayouts in high-G maneuvers. But a brain



integrity, the airframe is certified to +12 and -10 G's, though the wing has been shown capable of handling more than 22 G's.

This is a physically demanding, two-handed airplane, and the long control stick has plenty of room to grip with both fists. That's the preferred technique for keeping the stick positioned exactly where it's supposed to be during maneuvers. Power is pretty much a "set and forget" affair. Sukhoi pilots are fond of saying the aircraft has two levers: Lever A goes all the way forward, and leave her be.

All this makes it easy to fly aerobatics in the Sukhoi. You don't have to worry much about running out of airspeed when flying a vertical upline or going too fast downhill. But flying it well is a different matter. From the outside, any imprecision in control inputs is amplified; this airplane isn't going to cover up your mistakes. And for competition pilots trained on other aircraft, adjusting to the reversed P-factor from the prop's directional rotation can be surprisingly challenging. Volker estimates that an advanced aerobatic pilot would need about 100 hours of training in a Sukhoi to become comfortable flying routines at air show altitudes. But whether top-level aerobat or novice pilot, a flight in a Sukhoi is about as exhilarating an experience as a civilian can have this side of a Soyuz space capsule.

"It's not for the faint-hearted," Wieckowski says when we're back on the ground. "When you approach this plane and you're about to fly, if you're a little bit scared, I think it's an appropriate reaction. If it didn't have that adrenaline aspect, we wouldn't be doing it."

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