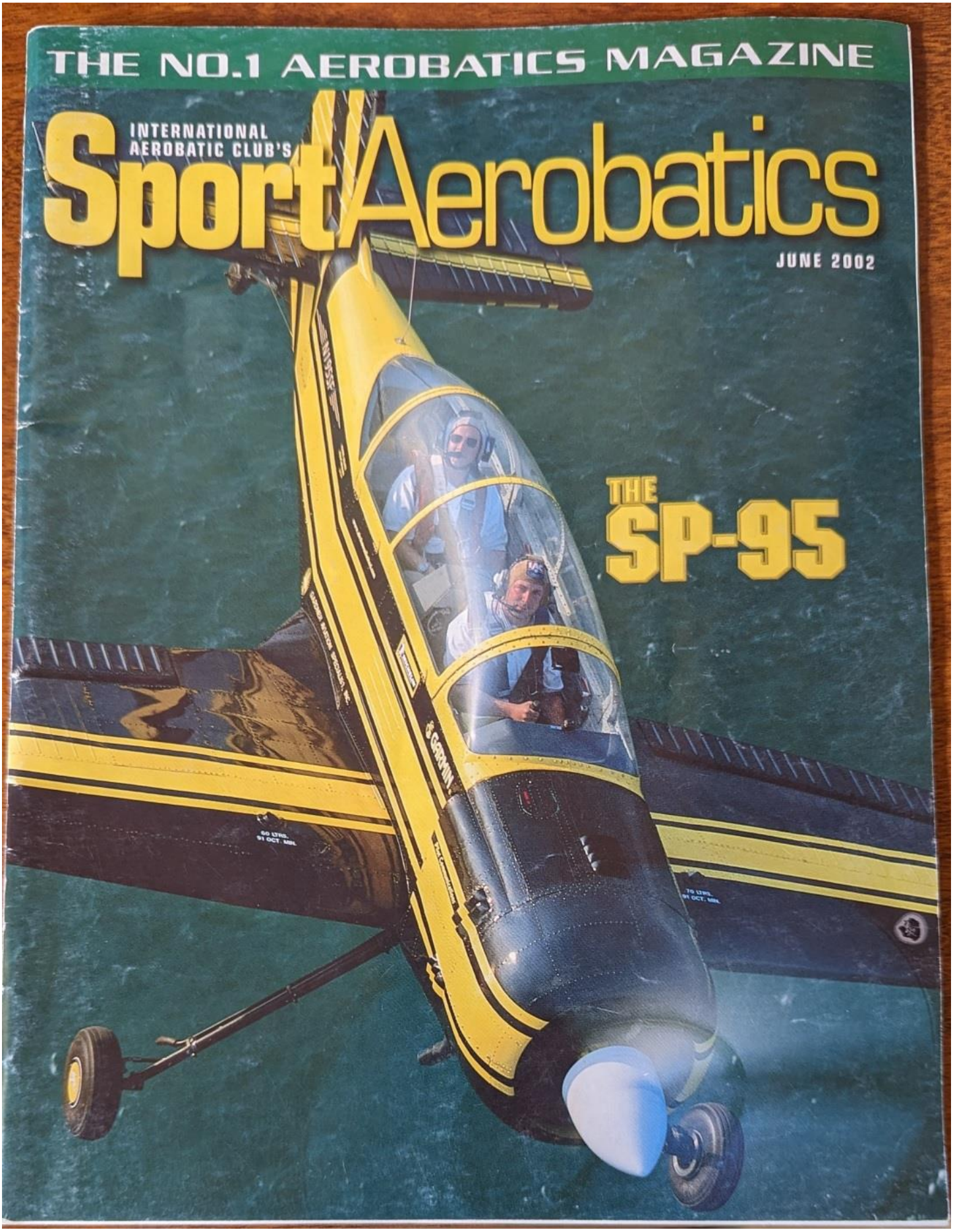
THE NO.1 AEROBATICS MAGAZINE

INTERNATIONAL AEROBATIC CLUB'S

SportAerobatics

JUNE 2002



THE SP-95


IT ISN'T PRETTY, BUT IT GETS THE JOB DO
N1955F
MICHELIN
GARMIN
GARDNER AVIATION SPECIALTY, INC.
DAVE HIRSCHMAN, MCFI-A

NE

THE SP-95

There is an undeniable family resemblance between Russia's Unlimited two-seat aerobats. Sukhoi 29 owners are quick to distance their graceful, composite thoroughbreds from those rough-edge, metal SP-95s.

LEEANN ABRAMS

JIM KOEPNICK

If the Sukhoi is a Cadillac, the SP is a John Deere tractor.

The Sukhoi is smooth-skinned, its lines graceful and refined. The SP's bumpy rivets resemble a bad case of acne, and its boxy shape is almost totally devoid of curves. In fact, the SP's most noticeable bend—a vertical stabilizer that could have been cut from an orca's dorsal fin—is so dorky that some U.S. owners have actually improved the airplane's appearance by lopping off the top with a die grinder.

"The original vertical stab gave the airplane such an odd appearance that we just had to do something," said Larry King, an SP owner and past president of IAC Chapter 3 in Atlanta. "We took about 9 inches off the top, down to the first rib. As far as we can tell, it hasn't changed the flight characteristics a bit."

Under the cowl, the Russian machines have lots in common: same M-14P engine and MT prop, same wing planform, same electrical and pneumatic systems, and same Cyrillic cockpit instruments. But there are some important differences, too.

The SP has a mechanism that allows the pilot to reflex the ailerons upward for better high-speed performance and then droop them as flaperons for improved low-speed handling during approach and landing. The canopy is convertible between one- and two-seat configurations, giving the airplane a unique Sybil-like ability to alter its personality from single-seat Unlimited contender to two-seat trainer.

"When it comes right down to it, the Sukhoi is faster, rolls better, and has more vertical penetration than the SP," said Phil Harcourt, who has owned and flown both. "But the differences are marginal enough that there aren't a dozen pilots in the world who can fully exploit them."

The comparison between the high-end Su-29 and the less-refined SP-95 appear analogous to another Russian pair: the single-seat Su-26 and the Yak-55M. In 1995, I had the opportunity to fly one of those airplanes in a side-by-side fly-off (see *Sport Aerobatics*, April 1995). The inescapable conclusion we reached then was that the Sukhoi out-

performed the Yak in virtually every respect—but only slightly.

And the most important statistic for me then (as now) was that the Yak could be acquired for about half the price. The same marketplace realities hold true for the Su-29 and SP-95, but the Sukhois have a decided numerical edge. Thirty-one Su-29s showed up on a recent check of the FAA aircraft registry—but there were less than a dozen SP-95s (or E-3s, a virtually identical aircraft).

Preflight

The SP-95 I flew was built in Russia by Technoavia in 1996. It's owned and flown by Chris Smisson, a Delta Air Lines captain and founder of *AirshowUnlimited.com*. The first impression of the airplane is that it's big, imposing, and rough-looking. It's the proverbial sow's ear, and it doesn't pretend to be a silk purse. Huge exposed rivets dot the skin, and the airplane seems to carry more corrugated metal than a Quonset hut.

The tubular steel landing gear is barely long enough to provide ground clearance for the 260-centimeter, three-blade MT prop. The straight gear is a real contrast from the bowlegged titanium landing gear on the Su-26 and Yak-55. The titanium gear was well known for its ability to absorb the shock from all kinds of bad landings, and Smisson says the tubular gear is equally forgiving. The SP has hydraulic brakes, and there are no fairings whatsoever to smooth the airflow between the main landing gear and the brake lines or between the gear and the fuselage.

The bottom cowl is easily removed to drain the oil from the lower cylinders. And its inner surfaces are cleverly rounded to form an airfoil that speeds the flow of cooling air over the geared, nine-cylinder, 360-hp engine.

The wing is symmetrical and virtually identical in size and planform to the Su-29 and Su-31. Two internal fuel tanks carry a total of 130 liters (about 34 gallons). That's enough for about 90 minutes at cruise with 30-minute VFR reserves. Fuel drains from both wing tanks to a header tank and then to the engine. A float gauge in each wing shows the quantity remaining.

The wing is approved in Russia for 12 positive and 11 negative g's. Nearly full-span ailerons have grooved trailing edges designed to lighten breakout forces. The SP tail is strut-braced, unlike the aerodynamically cleaner Sukhois. The shark-fin vertical stab in Smisson's airplane had undergone King's die grinder amputation. The rudder has a ground-adjustable trim tab, and the elevator has a cockpit-adjustable trim tab.

The airplane has a 24-volt electrical system powered by a B&C alternator, and a standard 750-psi pneumatic system for starting the engine.

Cockpit Layout

Inside the cockpit, the seating position is reclined about 30 degrees—not nearly so much as the 60-degree-plus Su-26 position.

Converting the plane between one- and two-seat configurations requires at least two people working several hours. Larry King and his partners have developed modifications for their plane that reduce that time to 10 minutes or less. But that's an exception. Smisson's is a stock airplane, and he leaves it in the two-seat configuration virtually all the time. That was fine with me since I was glad to have some company—especially since we were flying from Smisson's 2,300-foot, obstructed at both ends, uphill-downhill grass strip.

The SP's gauges are standard Russian, so airspeed is expressed in kilometers, altitude in meters, and time by a big clock with a mesmerizing, sweep second hand that must be a hallmark of every Eastern Bloc airplane. The joystick is about the size and thickness of a Louisville Slugger—another common trait among Russian aircraft, whose designers are true believers in mechanical advantage.

The SP-95 is flown solo from the rear seat, and the pilot's eye position is slightly behind the trailing edge of the wing.

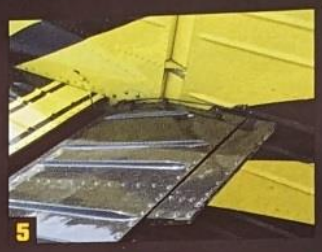
Engine start consists of turning the master electrical switch on, activating the shower of sparks, pressing the

At 350 kph, full-deflection rolls reach an eye-watering 400 degrees a second.

LEEANN ABRAMS


1


3


5


7


2


4

6

8

1. Carburetor air intake and exhaust pipes.
2. Tubular steel landing gear.
3. 360 hp M14-P swings an MT prop.
4. Horizontal and vertical stabilizer junction.
5. Elevator trim tab.
6. Cowl vent.
7. Tail feathers—nine inches were removed from top of rudder.
8. Right wing fuel cap and sight gauge.

pneumatic start button, and holding it down until the engine fires. Then the magneto switches go on, and as soon as the engine is running smoothly, the shower of sparks goes off.

Ground handling is tame for a tail-dragger. The airplane's long snout makes constant S-turns necessary, but they are easily controlled at taxi speeds with rudder, even while the tailwheel is unlocked. Run-up really gets the pilot's heart pounding with anticipation. The plane lunges forward each time the prop is cycled, and it's a struggle to keep the tail down and the brakes locked at high power settings.

For takeoff, the tailwheel should be locked, the prop lever full forward, and the flaperons neutral. Brake release and full power make the SP-95 lunge like an uncaged tiger. Engine torque and P-

1. Front cockpit.
2. Combined primer/wobble pump handle and instrument switches.
3. Rear cockpit. Yellow tank holds smoke oil.
4. Tailwheel lock and cowl flap control.
5. Trim lever, canopy jettison handle, throttle quadrant, and flaperon control.

factor require some left rudder during takeoff and climb (remember the prop turns "backward"). The lack of prop clearance dictates that the tailwheel remain on the ground throughout the takeoff roll. But the airplane's acceleration is so swift and the ground run so short that it's over before a rookie SP pilot like me had time to mess it up.

Holding the best rate of climb airspeed of 170 kph (105 mph) yields a climb rate of about 3,000 feet a minute with two aboard and full tanks, but keeping the plane that slow at full power requires an absurdly steep attitude. Even a relatively sedate cruise climb of 200 kph (124 mph) nets more than 2,000 feet a minute on a standard day.

Power-off stalls are benign with light, barely perceptible wing root buffeting and little if any wing drop. Power-on stalls are difficult to achieve at high power settings. Accelerated stalls are preceded by moderate airframe buffeting that can be felt and heard. And the onset of the accelerated stalls themselves can be extremely rapid. If the airplane is at all uncoordinated at the accelerated stall break, it will snap roll in a heartbeat. Many SP rookies have unintentionally snapped by pulling too hard at the top of loops. But the accelerated stall/snap tendency was most noticeable to me during inside rolling circles to the left. About halfway through each roll, the airplane would half-snap to the left, then half-roll the rest of the way. Smisson says aileron gap seal tape reduces that tendency. Curiously, E-3s have larger wing root fairings, and an E-3 pilot says they virtually eliminate unintentional accelerated stalls.

The joystick is about the size and thickness of a Louisville Slugger—another common trait among Russian aircraft, whose designers are true believers in mechanical advantage.

The SP-95's roll rate is about 360 degrees per second at high cruise speeds approaching 300 kph (186 mph). At 350 kph (217 mph), full-deflection rolls reach an eye-watering 400 degrees a second. Loops, hammerheads, and other over-the-top maneuvers can be entered with confidence at 250 kph (155 mph) or even less. But the SP really comes into its own at 350 kph or more. And even then, it's not even close to its VNE of 450 kph (279 mph).

The SP's maximum straight-and-level indicated airspeed, and the GPS confirmed airspeed, is 330 kph (205 mph) at 3,000 feet with the throttle and prop levers full forward. Vertical pulls from that speed and in that configuration produced altitude gains of 1,700 feet, with four vertical rolls and 10 seconds in the line before the plane out ran of energy.

I tried reflexing the ailerons, but frankly I didn't notice any difference in roll rate or flying characteristics during inside or outside maneuvers. The flaperons, however, were quite effective at slowing the approach speed without increasing the sink rate. Pulling the flaperon handle back to the full down position droops both ailerons about 15 degrees. I was concerned about my ability to land the SP at Smisson's rural airstrip, but the flaperons and large-diameter prop made the SP respond more like a Super Cub than an Unlimited aerobat.

Downwind at 250 kph (155 mph), throttling back to 82 percent prop rpm quickly slowed the plane to 220 kph (136 mph). A firm pull on the flaperon handle on the left side of the cockpit

below the throttle lowered them to their full down setting. On the base turn, increasing prop rpm to 100 percent instantly slowed the plane to its approach speed of 160 kph (99 mph). Minor pitch adjustments kept the airspeed steady, and small throttle movements bracketed the correct rate of descent. A curved final approach preserved forward visibility into the landing flare. But once the nose came up, the view out the front disappeared totally. Fortunately, the flat prop and aerodynamic braking quickly bled off any remaining flying speed. The airplane plunked down solidly, and the locked tailwheel kept it tracking straight ahead. I'm told the performance increases and visibility improves considerably in the single-seat mode.

"It's almost like having two different airplanes," King said. "One for giving rides and one for hard-core acro. The best part is, you don't have to decide which one you like better. If you've got one SP, you've got both airplanes."