

# S U K H O I • 2 6 M BEAROBATICS

*The Soviets escalate the aerobatics race.*

BY MARK R. TWOMBLY

**T**wenty-five minutes, take-off to touchdown. Fly no longer than 25 minutes, I am told. Nor would I want to. Total fuel capacity in the single tank ahead of the cockpit is 17 gallons. The geared, supercharged, 360-horsepower Vedeneyev M-14 nine-cylinder radial engine feeds on about 30 gallons per hour at full tilt, 20 at cruise power. The fuel gauge—a float bobbing inside a length of clear tubing snaking

PHOTOGRAPHY BY MIKE FIZER



through the cockpit—registers full until fewer than four gallons remain. If the float begins to drop, you'd better be looking for a place to land.

Twenty-five minutes would be safe, but 20 minutes would be safer: five minutes to fly to the practice area, 10 minutes to whoop it up, and five minutes to return to the airport. Okay, then, 20 minutes. Twenty minutes to come to terms with what Clint McHenry, reigning U.S. national aerobatic champion, calls "the most exciting aerobatic airplane in the world."

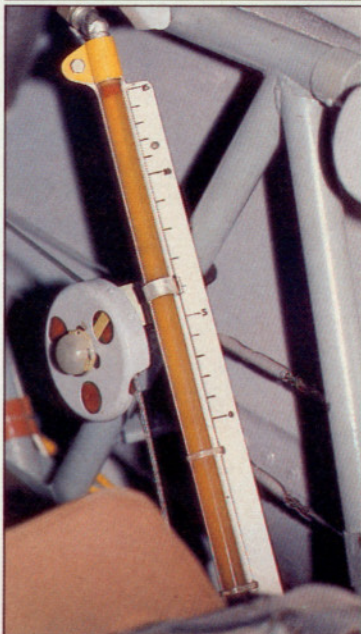
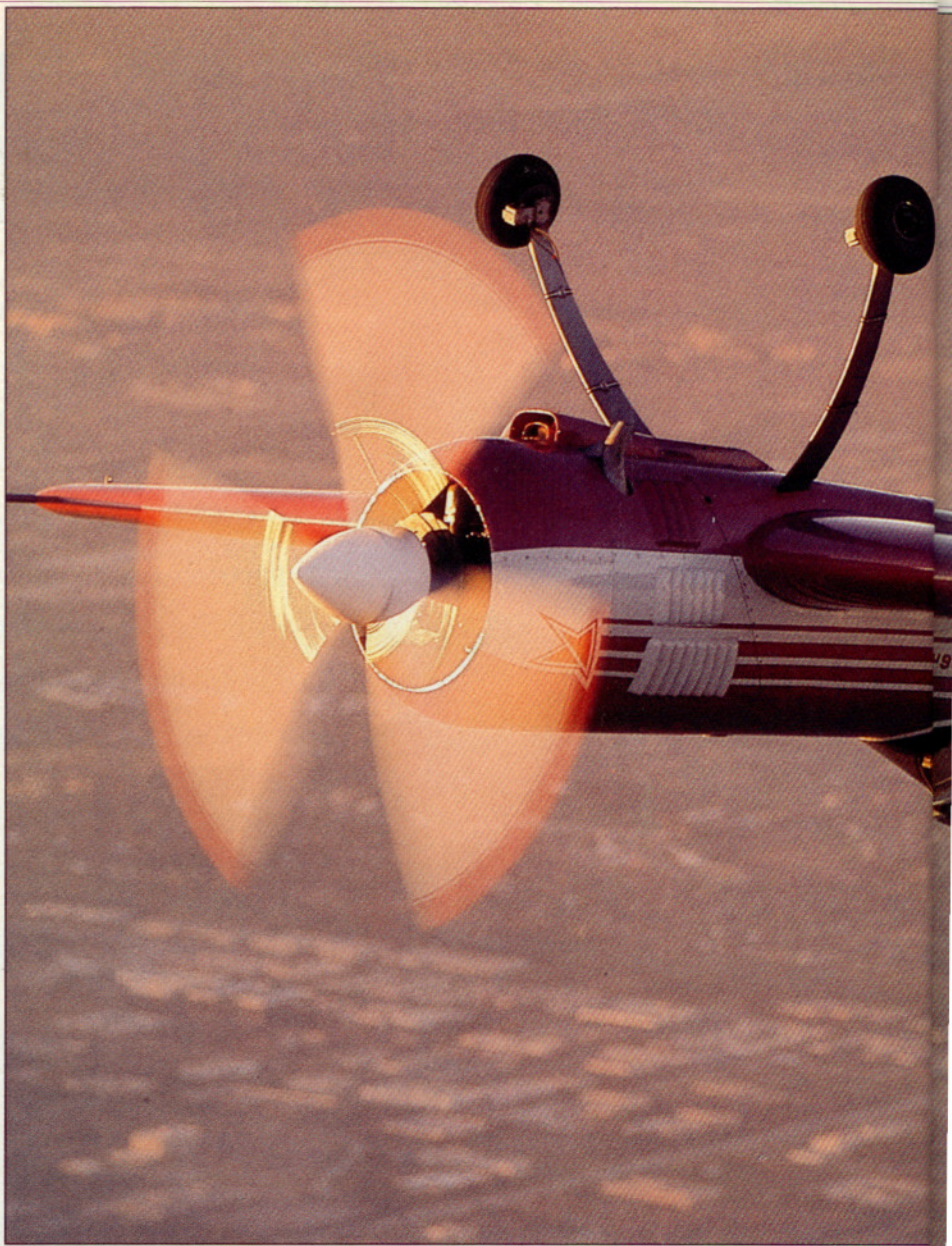
The aerobatic community got its first look at the Pavel Osipovitch Sukhoi design bureau's single-seat SU-26 in Hungary in 1984 at the world championships. The airplane had flown for the first time just a few months earlier and still was in development. The Soviets brought two to Hungary but relied mainly on the Yak 55 to compete against other national teams. Two years later at the world championships in England, the Soviets flew a refined version of the Sukhoi designated the SU-26M and won the men's and women's team titles.

The airplane was a sensation. Except for the move to monoplanes from biplanes, changes in world-championship-caliber aerobatic airplanes tend to be incremental and evolutionary—bigger engines for more spectacular vertical maneuvering and more effective control surfaces to shave milliseconds off roll rates. Conventional wisdom held that aerobatic airplanes must be small, lithe, and incredibly quick. Then in 1986, along come the Soviets to sweep the contest in the big, bruising SU-26M.

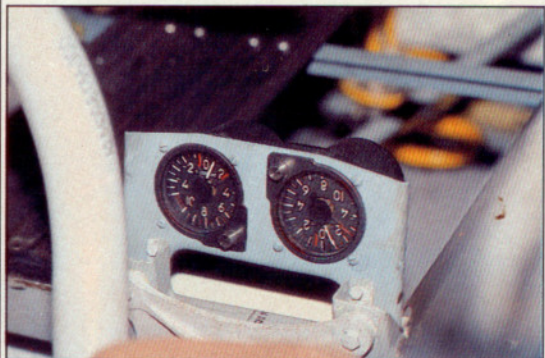
McHenry compares the Sukhoi's appearance with that of a 1937 Thompson Trophy racer, its sound with a Grumman Bearcat's. How could contest judges, used to peering at tiny airplanes dancing about the aerobatic box, not help but be impressed by this Baryshnikov among ballerinas.

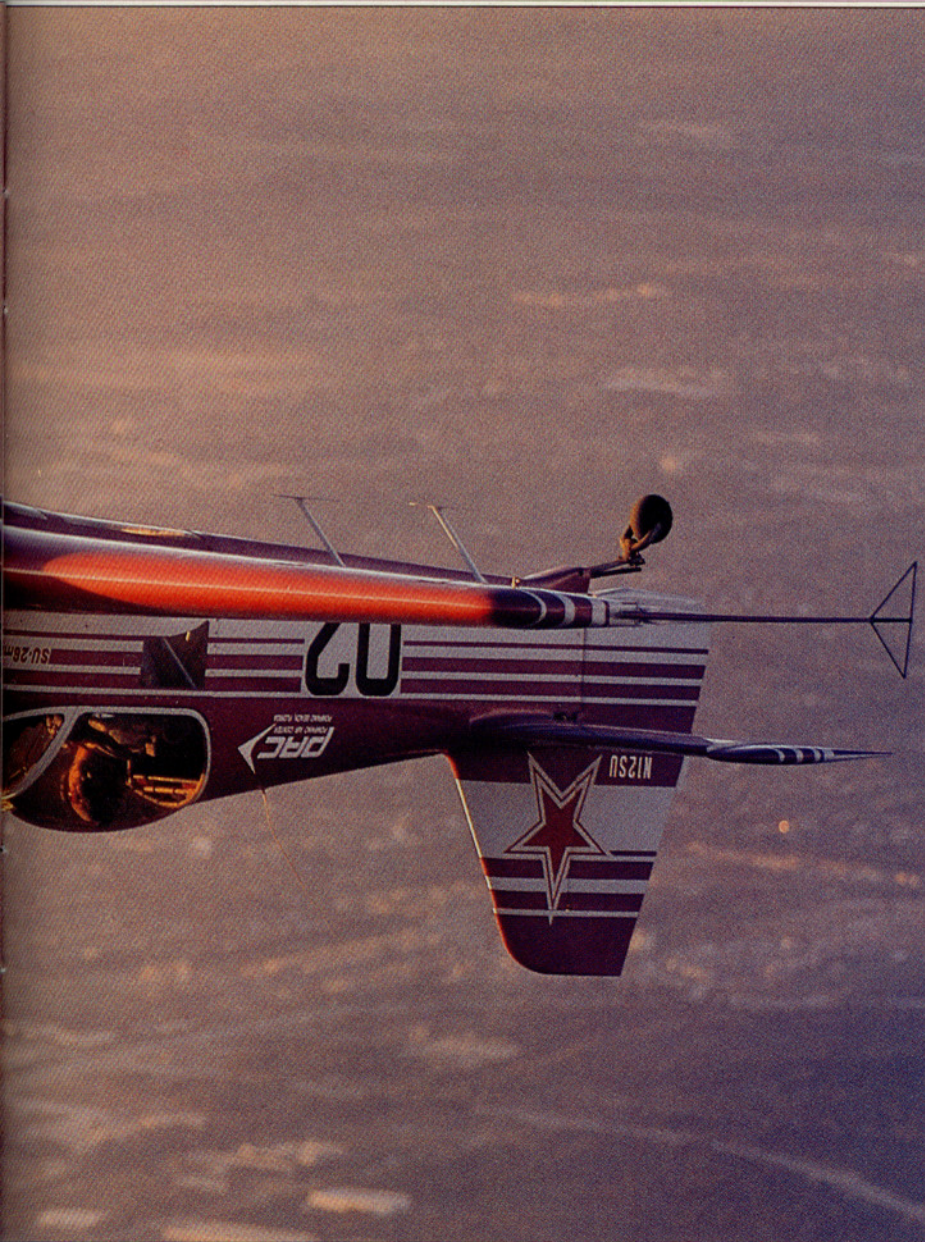
The Soviets were well aware of the stir the Sukhoi was causing and, moved by the spirit of perestroika, not to mention a desire for hard foreign currency, began to consider exports.

Through an intermediary in Moscow, Pompano Air Center (PAC) in Pompano Beach, Florida, began negotiating for the rights to distribute and sell the SU-26M in the Western world. PAC, a leading aerobatic sales and training center, sells half of all new Pitts Specials produced and most of the Stearmans remanufactured by Air Repair, Incorporated. PAC



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also imports the Extra 230 and 300, single- and two-seat unlimited-class aerobatic monoplanes built in West Germany. Clint McHenry operates PAC's aerobatic school and flies an Extra 300 in competition and air shows.

McHenry and PAC Executive Vice President Brian Becker recognized immediately the SU-26M's potential. Even though the relationship between Sukhoi and PAC is motivated on both sides by business concerns, Americans who see the SU-26M perform think of it less as a product of an international trade agreement and more as a good will ambassador from a foreign superpower that, until very recently, was characterized as the "evil empire."

While negotiating to become distributors, Becker and McHenry flew to the Soviet Union to visit Sukhoi and meet with Soviet export officials. During their two-week stay, they were granted unprecedented permission to fly aerobatics—McHenry in an SU-26M, Becker in a Yak 52—at an airport on the edge of Moscow. Russian aerobatic pilots practice their craft directly over the airfield (that's the reason the SU-26M carries but 17 gallons of gas), so the two Americans found themselves looping and rolling with a view of Red Square.

PAC's first two Sukhois were delivered last July to Wittman Field in Oshkosh during the Experimental Aircraft Association's annual fly-in and convention. The airplanes were brought over from the Soviet Union inside an Antonov AN-124, which vies with the Lockheed C-5 as the world's largest production airplane. Needless to say, the Soviet fleet—the AN-124 and the two SU-26Ms—were the objects of intense curiosity and interest by the hundreds of thousands of aviation faithful who attend the EAA spectacle.

Several months later, I cajoled Becker into agreeing to let me fly one of the Sukhois. This was no small decision on his part. Though not difficult to fly, according to Becker, the SU-26M is different. For one, the propeller turns the wrong way (counterclockwise, viewed from the cockpit). That means *left* rudder on takeoff and climb and during aerobatics to counteract torque.

There is torque aplenty, too. The big radial turns a 7.8-foot-diameter, three-blade, wooden-core, fiberglass-skin Hoffmann propeller. Even when the airplane is at rest on all three wheels, the clearance between propeller tips and ground is minimal. Landing is the sport-

iest phase of flight in the Sukhoi. While preparing to fly it, I was repeatedly told to avoid touching down on the main gear first. The gear legs are springy, and the potential for a prop strike is very real. Three-point or even tail-first touch-downs are the rule.

The SU-26M is constructed of advanced, expensive materials, including titanium alloy in the wing ribs, main gear, and exhaust system; carbon fiber and Kevlar skins; carbon fiber spars; and stainless steel fuselage structural tubing. There is no official exchange rate for the ruble, so the retail price of \$208,000 is more a reflection of the maximum the Western market will bear than what it cost Sukhoi to build it. Becker, bless him, did not invoke the "you break it, you buy it" rule before I taxied away.

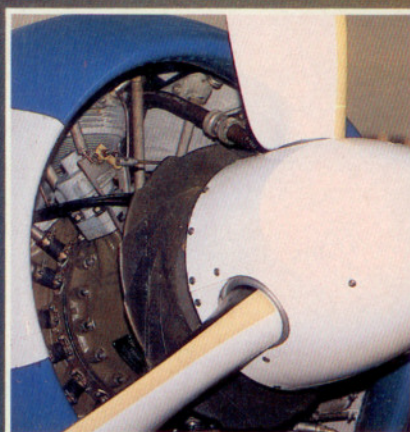
Preparation for the flight consisted of dual in an S-2B Pitts with McHenry. If you can take off and land a small, light, and powerful Pitts, you can fly the larger but still light and powerful Sukhoi, Becker reasoned. McHenry and I also spent several hours discussing the Sukhoi's systems, handling, and quirks.

Chief among the latter is the panel. The one I would be flying has not been Anglicized. The instruments are cali-

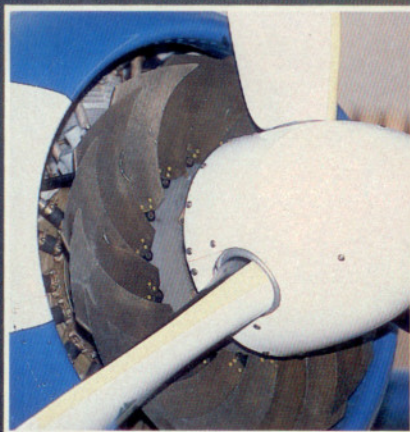
brated in metric units, and instructions are in the Cyrillic alphabet. This calls for some mental gymnastics in flight. For example, the manifold pressure gauge is marked in whole numbers from four to 14, with no clue as to their meaning. The tachometer reads in percents. Climb at six for throttle and 80 percent rpm, conduct aerobatics at whatever throttle is needed and 90 to 95 percent rpm, McHenry advises. Fly the downwind at about 300—meters, not feet—and trim for 160 to 170—kilometers per hour, not knots (86 to 92)—on final.

The pilot sits almost on top of the fuselage in a seat that reclines 45 degrees. Legs extend almost straight ahead, with feet strapped into leather stirrups on the rudder pedals. The parachute is built into the seat, and the Soviets claim it is possible to successfully bail out as low as 60 meters (about 200 feet) above the ground provided the airplane is traveling at a forward speed of at least 100 kph (54 knots).

The stick is a massive implement that rises in gentle twists and turns to chin height, presumably for maximum leverage. Out ahead, the long nose points to the sky. Briefing complete, McHenry closed the beautifully sculpted canopy



*The accelerometer registered 6.5 Gs. Child's play. The Sukhoi was not even breathing hard.*



and gave me a thumbs up.

Radials are the same the world over: Someone has to pull the prop through a few times to pump out oil that has accumulated in the bottom cylinders. The starting sequence for the Sukhoi then begins by pulling numbers one, two, three, and five circuit breaker switches in the middle of the panel to turn on electrical systems. Check to ensure that the generator and chip (metal particles in the oil) annunciators are lit, then open the ignition booster switch. Pump the primer to inject fuel into the cylinders, give it a half turn, and pump it again to pressurize the fuel system.

Work the slide throttle a couple of times and crack it open, mash the brakes, flip on the magneto switches, and depress the starter lever. A pneumatic starter injects air into the cylinders



to get them moving. The engine belched blue smoke and started immediately.

The free-swiveling tailwheel is unlocked for taxiing, locked for takeoff. A dab of power, and the Sukhoi was under way, snaking out to the runway.

A short wait ensued for landing traffic, and then the tower gave the all clear. Like the needle on the cylinder head temperature gauge, my anxiety level had slowly been rising. This was going to be different from the Pitts, where McHenry was sitting just ahead to coach me and catch me before mistakes grew into something more serious. Now he was back on the ramp with Becker, both of them chewing their nails, no doubt.

A nervous calm prevailed in the cockpit. "What will be, will be," I told myself as I pushed the throttle forward. Before I even had a chance to screw up and run off the right side of the runway, the Sukhoi launched and was climbing. Back off the throttle to six and the prop to 80 percent per instructions, jiggle the stick and rudder to get a feel for things, and take a look around.

Oops! Didn't start the chronometer to keep tabs on the 20-minute window. Yow! Forgot to close the metal shade covering the cylinders. The oil still was a bit cool before takeoff, so I had extended the shutter-like shade ringing the prop spinner. McHenry had warned that if it is left in the extended position during the climb, cylinder head and oil temperatures could easily exceed their limits. Fortunately, they still were comfortably in the green.

It took four minutes to reach the aerobic practice area northwest of Pompano and another minute to get into position over the grid-like fence lines below. All the while, I waggled the wings, did steep turns, and blipped the stick to gain some confidence with the supersensitive handling.

Pitch forces are extremely light, as McHenry had said they would be, and remain so even with increasing speed. Ailerons are a bit heavier than expected, but lightning fast.

The Sukhoi was designed for strength, power, and maneuverability, characteristics that Soviet pilots exploit in routines chock-a-block with multiple vertical and snap rolls. The flight manual lists G-load limitations in aerobatic trim as plus 12 and minus 10. (The negative scale on the accelerometer only goes to minus five Gs, so there are two in the cockpit, one of them mounted upside down.) Sukhoi marketing literature

claims an ultimate load limit of 23 Gs.

The wing has zero dihedral and a thick, symmetrical airfoil that allows for inverted flight and abrupt changes in attitude without stalling. Ailerons span almost the entire length of the trailing edge of the wing. When an aileron is down, its leading edge protrudes above the wing to increase the power of the ailerons. It certainly seems to work: The SU-26M rolls at 360 degrees a second.

Twelve minutes gone; eight to go. The long nose made an excellent sight gauge for monitoring heading as the airplane



flicked through a series of rolls, loops, Immelmans, and Cuban eights. I jammed the stick forward, yanked it back, plunged it far to the left, then back to the right. The accelerometer registered 6.5 Gs. Child's play. The Sukhoi was not even breathing hard, but I was on an adrenaline high, hollering at the top of my lungs.

Fifteen minutes elapsed. Time to head back. Reluctantly, I turned southeast toward Pompano, and at 20 minutes past takeoff, the Sukhoi was sailing on the downwind leg. Not much to do in the cockpit except review the final approach and landing procedures: Check that the tailwheel is locked, slow to 170 kph, and push the propeller control in to low pitch. The Vedeneyev growled.

McHenry's frequent admonitions to

avoid touching down on the mains had an effect. According to reports received later from the small crowd that had gathered to witness the arrival, the Sukhoi flared beautifully in the proper three-point attitude. Trouble was, I flared at altitude—about five feet agl. The Sukhoi quit flying and dropped to the tarmac with a dull thud, momentarily splaying the bowed gear legs and scrubbing off some tire rubber. (I flew the reddish-colored one because the blue one had no tread left on its tires after about 50 hours total time.) Others may have scored the landing as medium-hard on a scale of trampoline to squeaker, but there was no bounce and no prop strike. We were down on the first try and tracking straight.

The Sukhoi was reluctant to comply with my wishes to exit the runway until I remembered to unlock the tailwheel. The drive back to the ramp was slow so I could savor the last few moments in this beast. One last blip of the throttle to expunge fuel and oil, and off with the mags. The engine chugged to a stop. Mission accomplished.

PAC has sold its first SU-26M to Tom Jones, an air show performer who already has booked a full season of appearances. Sukhoi is installing integral fuel tanks in the wings so the airplane can be flown cross country for more than 25 minutes.

McHenry is not yet ready to tackle a world championship in a Sukhoi. Competition pilots are so finely attuned to their airplanes that a change in seat position of an inch or two can throw them off. The Sukhoi is radically different in many ways, and it will take many hours of practice before he feels comfortable enough with it to compete.

Meanwhile, PAC has struck an agreement with the Soviets to form a joint venture involving general aviation products and services. The agreement could involve reciprocal programs in flight training, component manufacturing, and exporting of airplanes from light singles through turboprops. The Soviets also are talking to several U.S. aviation manufacturers, including Piper Aircraft Corporation and Gulfstream Aerospace Corporation, about cooperative projects.

The SU-26M is not for everyone. Air show performers and unlimited-class competition pilots only need apply. But as the first product to emerge from budding business partnerships between U.S. and Soviet aviation companies, it is in a class by itself. □