



Antonov AN-2

# The Flying BEAR

**A biplane  
that's as big  
and rugged as the  
land it was born in**

**T**here is no way that a photograph of an Antonov AN-2 Colt can prepare you for an in-person encounter. It is a behemoth, presumably the world's largest single-engine biplane, and it dwarfs every other single in its vicinity. A massive caricature of an airplane, it has the appearance of something intended for the Flintstones.

The "Ant" was designed by Oleg Antonov to serve a variety of utilitarian roles. It made its maiden flight in the Soviet Union on August 31, 1947, and its small Ash-2 750-horsepower radial engine was quickly replaced with the more substantial 1,000-hp Shvetsov engine driving a huge four-blade, constant-speed propeller. (The Shvetsov is a licensed

**BY BARRY SCHIFF**

PHOTOGRAPHY BY MIKE FIZER



copy of the dependable Wright R-1820 Cyclone that powered many DC-3s.)

Its appearance suggests that Antonov was more interested in rugged simplicity than graceful lines. The airplane was intended to operate under harsh conditions in remote locations. Although there is nothing beautiful or fragile about the Colt—some call it ugly—Russian pilots holding the big biplane in high esteem affectionately refer to it as *Anushka* (Annie).

The Soviets built more than 5,000 Colts, but production was moved to Poland in 1960 where PZL-Mielec built some 12,000 units. China also produced many (called Y-5s) beginning in 1957. The production run spanned an incredible 50 years (1947 to 1997), during which 20,000 to 24,000 units took to wing.

Although the introduction of a biplane in the postwar era might seem anachronistic, the extra wing area was an excellent way for Antonov to provide the prodigious quantities of lift needed to operate a 12,125-pound machine out of unimproved strips less than 1,000 feet long. The extra span also allowed him to hang an assortment of high-lift devices on the narrow-chord wings. It was a matter of form following function.

The entire leading edge of each upper wing is cuffed with corrugated slats that open automatically at large angles of attack and close as the angle of attack is reduced (a result of the center of lift's movement). Bungee cords hold the slats closed when the aircraft is on the ground. The upper wings also are equipped with electrically operated, slotted flaps and ailerons that droop 16 degrees when the flaps are deployed. In effect, the upper wings have full-span flaps. The lower wings do not have ailerons but are configured with full-span flaps that operate in conjunction with the upper-wing flaps.

The Colt is an all-metal airplane except for the fabric-covered horizontal stabilizer, control surfaces, and those portions of the wings aft of the forward spars.

The AN-2 featured here is owned by Robert Haley, a line-maintenance planner for United Airlines who became interested in Eastern European aircraft after purchasing a Yak 18T several years ago. He then founded Red Sky Aviation in Livermore, California, which specializes in importing and selling these exotic aircraft. His current inventory consists of a Polish-built Yak 12, two Yak 52s, and, of course, his AN-2, which he exhibits at airshows.



**There's nothing fancy or particularly comfortable in either the cockpit (facing page) or passenger cabin (above). Flying on instruments would be difficult.**



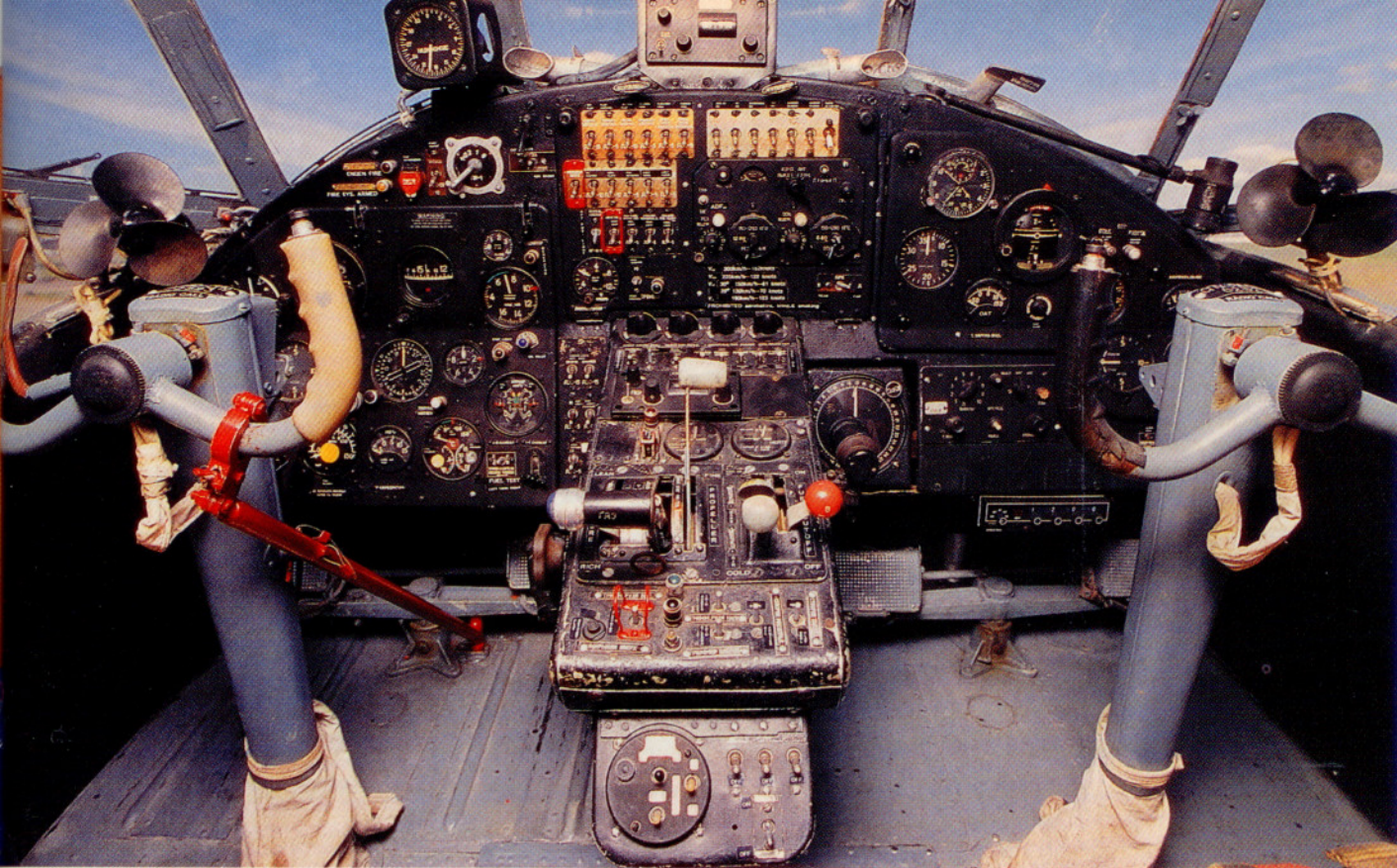
N707WA rolled off the Polish assembly line on November 4, 1968, and bears the paint scheme of the Soviet airline, *Aeroflot*. (Aeroflot was once regarded as the world's largest airline because it included in its fleet thousands of AN-2s used as crop dusters, utility transports, and cargo haulers in the Siberian hinterlands and other remote areas.)

Preflighting a Colt includes some unusual items. One is the engine-driven air compressor that is used to operate the pneumatic brakes and to pressurize a 490-cubic-inch air bottle installed in the fuselage. The 710-psi bottle is used to inflate tires and oleo struts (depending on gross weight and type of runway surface).

There are three fuel tanks in each upper wing with a total usable capacity of 310 gallons. Access to the filler caps without a very tall ladder requires climbing up the side of the fuselage using four kick-in steps and walking along a catwalk on top of the fuselage. If the Colt cannot be refueled from above the wing with a conventional hose, a ground-fueling valve accessible through the left side of the cowling allows fuel to be pumped into the tanks from barrels on the ground using the ship's electrical power.

The entry door on the left side of the fuselage is actually a section of a much larger cargo door that is 4.4 feet wide and 5 feet tall and can be opened when loading outsized items.





A door in the aft bulkhead of the cabin leads to the long, voluminous tail cone. Although this area may not be used for cargo, it can accommodate light loads such as live chickens and ducks. The wide, spacious cockpit is separated from the cavernous, 12-seat cabin with an accordion-style door. The entire roof of the cockpit can be quickly unlatched, removed, and used as an emergency exit.

Soviet engineers did not have much regard for ergonomics. Switches and controls are scattered helter-skelter and do not accommodate a normal scan pattern. Flying on instruments in the Colt would be a challenge, especially for an American pilot unable to interpret the Cyrillic markings and adapt to the numerous metric indications. The instrument panel in Haley's airplane is completely original except for the added Bendix-King transponder. Standard equipment includes a humongous ADF, a radio altimeter, and a heated clock (don't ask).

The ventilation system includes a small rubber-bladed fan on each side of the cockpit. These are quite handy when sitting in this greenhouse of a cockpit. The windows consist of 28 glass panes, and the side windows bulge outward a foot so that either pilot can see straight down with the wings level. Looking aft, a pilot can see almost straight back.

The propeller is almost 12 feet in diameter and should be pulled through by hand if the engine has been idle for more than an hour or so. Although Arnold Schwarzenegger could do it alone, it is much easier for a crew of three to attack and keep the prop moving through 20 blades.

Starting the Shvetsov (or Wright, if you prefer) is complicated and best accomplished by a pilot with three hands. Confusing matters is a "mixture-corrector lever" that moves aft to enrich and forward to "make weaker." The carburetor-heat control also operates "backwards."

A spring-loaded toggle switch is positioned up to energize the inertia-wheel starter. You can tell that the wheel has reached maximum rpm when the distinctive whining sound

reaches a constant pitch and no longer draws electrical power. (A fully charged battery permits only three or four start attempts.) You then release the toggle and push up on another to engage the starter. After four blades pass before your eyes, turn on the ignition, operate the electric primer, and hope that the engine starts before the inertia wheel poops out (in which case the procedure is begun anew).

The big radial seems to awaken one cylinder at a time, belching and coughing copious clouds of smoke guaranteed to create IFR conditions for anyone standing behind.

Prior to my arrival in Livermore, I had asked Haley to clean the aircraft in preparation for photographs that would be taken. He replied that "it would be clean until after the first engine start." The airplane sprays as much oil on the fuselage as it burns. (Engine oil consumption is four to five quarts per hour, and oil capacity is 132 quarts.)

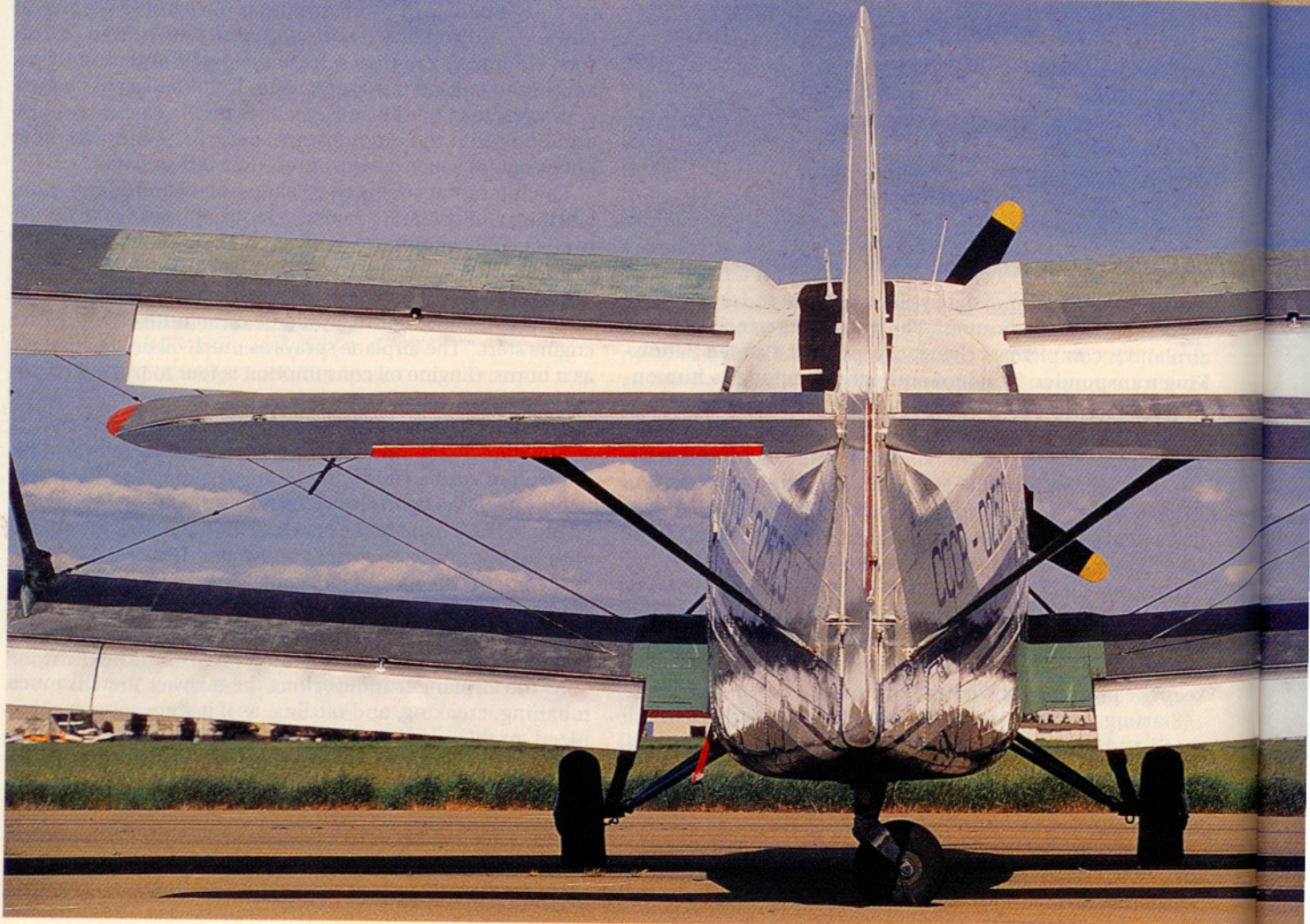
"Washing it," he added, "is like bathing a brontosaurus."

The rudder and fully castoring, self-centering tailwheel are controlled with a rudder bar instead of pedals. The brake handle is on the control wheel, and it appears and is operated much like a hand brake on a bicycle. Squeezing the handle with the rudder bar neutral applies pneumatic brake pressure to both wheels. But engaging the brakes when the rudder bar is angled more than 15 degrees causes pressure to be applied only to one. Apply right rudder and only the right brake operates, and vice versa.

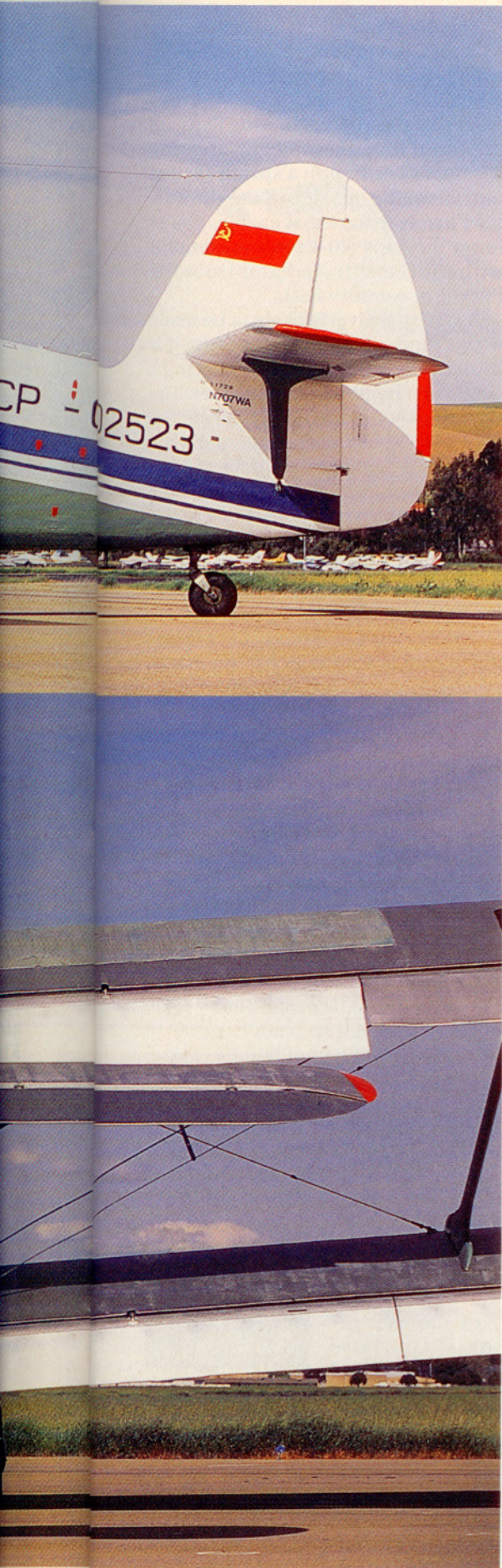
As the airplane trundles along the taxiway, there is much moaning, creaking, and rattling, as if it were some mechanized, prehistoric beast. Intermittent use of the air brakes adds hissing and wheezing to the orchestral mix. The lumbering Colt has a personality of its own and sounds like an 18-wheeler being maneuvered into a tight parking space.

The huge supercharged Shvetsov on the nose limits forward visibility, so some taxiing S-turns are in order. Considering the almost 60-foot wingspan, I expected some difficulty taxiing in









**You need to stand next to the Antonov AN-2 Colt to understand its size. The lower wings do not have ailerons.**

tight quarters but was pleasantly surprised. The upper wing is so high that it easily passes over other aircraft that would otherwise be in the way, and the lower wing is short enough to pass between them.

A before-takeoff checklist is essential and directs you to every nook and cranny in the cockpit. Finally, check the mags at 2,000 rpm and the prop at 1,900; set the flaps to 15 degrees; and the Colt is ready to rumble.

Haley suggested that I not push forward on the control yoke during the takeoff roll. "Just let it go and she'll fly off by herself. There's no need to raise the tail."

I opened the throttle for a 1,000-hp takeoff setting of 2,200 rpm and 1,050 mm (41.3 inches) of manifold pressure. Before there is time to think about it, the "Ant" levitates in three-point attitude, all wheels rising from the ground simultaneously. I had such a handful of airplane that I didn't have a chance to glance at how many knots we had. I did know, however, that we didn't have enough, so I lowered the nose to gain speed.

## **I am convinced that the Soviets developed this airplane as a training aid for their Olympic wrestling and weightlifting teams.**

In normal climb at 1,800 rpm and 800 mm (31.5 inches) there is substantial torque and p-factor. This explains why the Colt has such a seemingly oversized tail.

The duties of the copilot include constantly fidgeting with the engine knobs, electrically operated shutters for the external oil cooler, and the electrically operated cowl flaps to keep engine temperatures under control. A pilot flying alone would have his hands full. Although essentially a single-pilot airplane, the Soviets required that a flight engineer sit in the right seat to operate the engine and its systems.

The U.S.-designed engine thankfully turns the "right" way as compared to most Russian engines that turn the "wrong" way (counterclockwise when viewed from behind). My right leg has

been conditioned for many years to push against p-factor and no doubt is the stronger of the two. I question if my left leg could have contained the Colt's right-turning tendency for very long during slow flight with a high power setting had the engine turned the other way.

The aircraft has electric trim about all three axes, but no trim-position indicators. Instead, a light for each illuminates only when the tab is neutral. At other times, trim position is largely guesswork.

At its maximum gross weight at sea level, the Colt climbs its best (551 fpm) at 78 knots. Although its cruise speed of 100 knots (1,600 rpm and 700 mm) is unimpressive, its ability to haul a useful load of 4,510 pounds out of an unimproved strip less than 1,000 feet long is *very* impressive. Fuel burn during cruise is 45 to 50 gph, a specific range of only 2 nm per gallon.

The AN-2 has a sluggish and delayed roll response. It also has an overbanking tendency during turns that requires "holding off" bank with "top" aileron. The Colt could use the additional ailerons found on the lower wing of many other

biplanes. After an hour of flying in formation with a photo airplane, my forearm ached and my right leg throbbed. I am convinced that the Soviets developed this airplane as a training aid for their Olympic wrestling and weightlifting teams. Pitch control is more authoritative and lighter, but I was nevertheless grateful for the electric elevator trim.

Stall speeds are difficult to determine because there is no identifiable stall warning or break, nor is there a stall-warning indicator. Controlled descents can be made at 25 KIAS with the yoke held fully aft. According to the pilot's operating handbook, "an inadvertent stall is impossible."

During an approach to a full-power stall (if there is such a thing in the Colt), you can run out of right rudder and not be able to arrest the left yaw.



# SPECSHEET

## Antonov AN-2 Colt

As flown: \$68,500

### Specifications

|                                    |  |
|------------------------------------|--|
| Powerplant .....                   | Shvetsov Asz-62IR,<br>1,000 hp @ 2,200 rpm                         |
| Recommended TBO .....              | 1,200 hours (first overhaul)<br>1,000 hours (subsequent overhauls) |
| Propeller.....                     | PZL AW-2 constant speed<br>4-blade, 142-in dia                     |
| Length.....                        | 40 ft 8 in   |
| Height .....                       | 13 ft 2 in   |
| Wingspan .....                     | 59 ft 9 in   |
| Wing area .....                    | 770 sq ft  |
| Wing loading .....                 | 15.7 lb/sq ft  |
| Power loading .....                | 12.1 lb/hp   |
| Seats.....                         | 12+2   |
| Cabin length (excl. cockpit) ..... | 13 ft 9 in   |
| Cabin width .....                  | 5 ft 5 in  |
| Cabin height .....                 | 6 ft 1 in  |
| Standard empty weight .....        | 7,605 lb   |
| Useful load .....                  | 4,520 lb   |
| Useful load w/full fuel .....      | 2,618 lb   |
| Maximum takeoff weight.....        | 12,125 lb  |
| Maximum landing weight .....       | 11,574 lb  |
| Fuel capacity, standard .....      | 317 gal (310 gal usable)<br>1,902 lb (1,860 gal usable)            |
| Baggage capacity.....              | Entire cabin (453 cu ft)   |

### Performance

|  |  |
|--|--|
| Takeoff distance, ground roll.....         | 820 ft                                 |
| Takeoff distance over 50-ft obstacle ..... | 1,558 ft                               |
| Maximum dem. crosswind component .....     | Unknown                                |
| Rate of climb, sea level.....              | 551 fpm                                |
| Maximum cruise.....                        | 10,000 ft, 123 kt,<br>58 gph (348 pph) |
| Normal cruise.....                         | 3,500 ft, 103 kt,<br>45 gph (270 pph)  |
| Maximum range .....                        | 490 nm                                 |
| Maximum speed (sea level) .....            | 139 kt                                 |
| Service ceiling.....                       | 14,435 ft                              |
| Landing distance over 50-ft obstacle ..... | 1,400 ft                               |
| Landing distance, ground roll .....        | 738 ft                                 |

### Limiting and recommended airspeeds

|   |               |
|---|---------------|
| V <sub>X</sub> (best angle of climb) .....            | 60 KIAS       |
| V <sub>Y</sub> (best rate of climb) .....             | 78 KIAS       |
| V <sub>A</sub> (maneuvering speed) .....              | 103 KIAS      |
| V <sub>FE</sub> (max flap extended) .....             | 70 KIAS       |
| V <sub>NO</sub> (max structural cruising) .....       | 122 KIAS      |
| V <sub>NE</sub> (never exceed) .....                  | 162 KIAS      |
| V <sub>R</sub> (rotation speed) .....                 | 46 KIAS       |
| V <sub>S1</sub> (clean) .....                         | Insignificant |
| V <sub>SO</sub> (stall in landing configuration)..... | Insignificant |

All specifications are based on manufacturer's calculations. All performance figures are based on standard day, standard atmosphere, sea level, gross weight conditions unless otherwise noted.

The AN-2 has a best-glide speed of 65 knots, but landing approaches are usually made with power because this is better for the engine.

During the approach, wing flaps are deployed incrementally by pressing with your left thumb a spring-loaded button on the left side of the throttle. It's a handy feature that enables you to lower the flaps (40-degree maximum) without removing a hand from the throttle or control wheel.

Your first arrival is likely to be made with a thud, as mine was, because it is initially difficult to adjust to flaring a single at a height of 20 or 30 feet. The slats deploy automatically during the flare and if things work out properly, the Colt sort of "squishes" onto the ground in three-point attitude. It is something like landing on a wet sponge.

Crosswind landings can be a problem. The aircraft touches down so slowly (28 knots, according to GPS) that the rudder has lost much of its effectiveness.

The AN-2 is a workhorse, not a sport-plane, and is not fun to fly. Nor is it as much difficult as it is different. Everything seems to happen in slow motion. The name, *Colt*, is a misnomer that belies its behavior, which is not perky.

The mixture control does not have an idle-cutoff position. The engine is shut down with a separate stop lever that cuts off the fuel supply to the carburetor. If the airplane won't be flown for a while, postflight duties include removing the spark plugs from the bottom cylinders. This allows oil to drain into a can instead of pooling in the cylinders.

Haley claims that despite its size, the AN-2 is trouble free, relatively easy to maintain, and does not require special tools. His aircraft has a total time of 17,000 hours and has been fully reconditioned. With a price tag of only \$68,500, the Colt is a bargain for the right buyer. The bad news is that although *Anushka* is fully certified in numerous countries, the FAA only allows it to operate here in the Experimental category, a subject of much controversy. This imposes restrictions that make the Colt impractical for most potential owners.

There are only a few dozen of these gentle giants in the United States, and only a handful are kept airworthy. The AN-2 is a primitive, simple, utilitarian workhorse that turns heads wherever and whenever it lands.

**i** Visit the author's Web site ([www.barryschiff.com](http://www.barryschiff.com)).

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