



Trimotor

BY JOHN L. BAKER

*When it comes
to airplanes,
there is a bit of
the romantic in
each of us,*

*and the romance in my
psyche had a complete runaway
recently.*

*As a result of a
conversation with a longtime
friend, Alan Stephen, who was
about to become the president of
Scenic Airlines based in Las Vegas,
Nevada, I was given the
opportunity to get a type rating in
Scenic's Ford Trimotor.*

*Time Warp. In my
mind I saw all the old movies
featuring Trimotors on rainy ramps
with dapper crews in jodhpurs and
pencil moustaches, waiting for the*

PHOTOGRAPHY BY ART DAVIS

passengers as they arrived in their Pierce Arrows, Cadillacs and Rolls-Royces.

Soon hard reality interjected itself into these reveries. The first hint of what was to come occurred after I landed in Las Vegas. I got out of the airplane and it was like stepping into an oven. The temperature was 108 degrees. Upon meeting my instructor, a captain with a major airline, it quickly became clear that flying this wondrous piece of machinery was going to be all business.

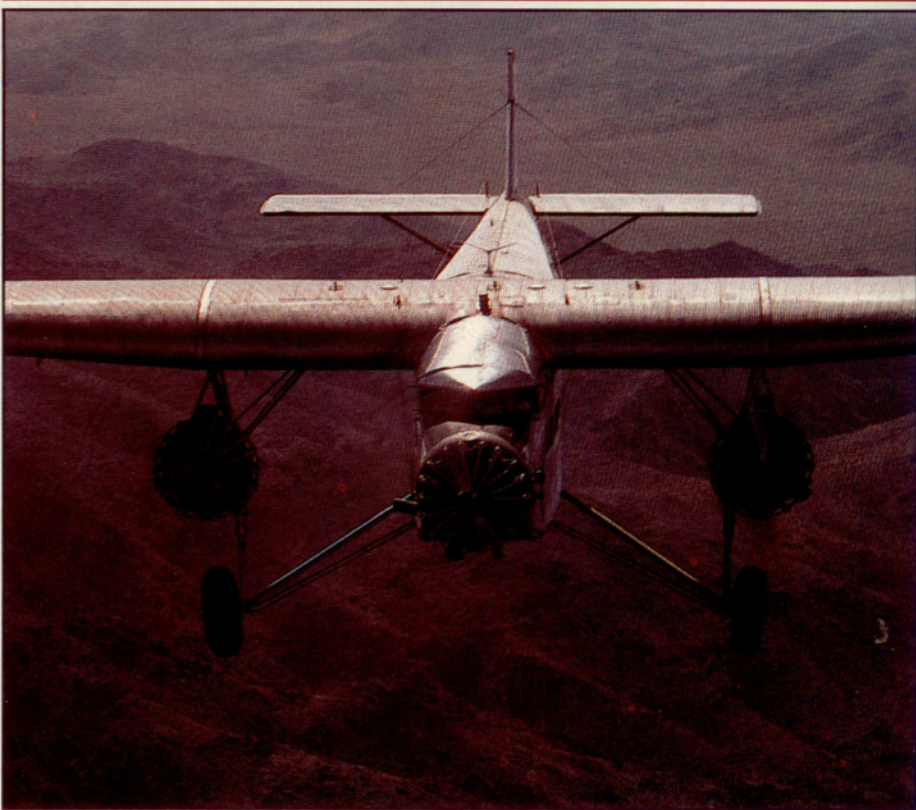
Within one hour of arriving in Vegas, we had started ground school. It ran from 5 p.m. until 11:30 that night. It soon became apparent that I was interjecting myself into the middle of a love affair. My instructor, Captain Bernie Godlove, had been flying this Trimotor, N414H, for a number of years and had even taken a three-month leave from his airline job to fly the Scenic Trimotor, one of the handful still in flying condition. And love her he does.

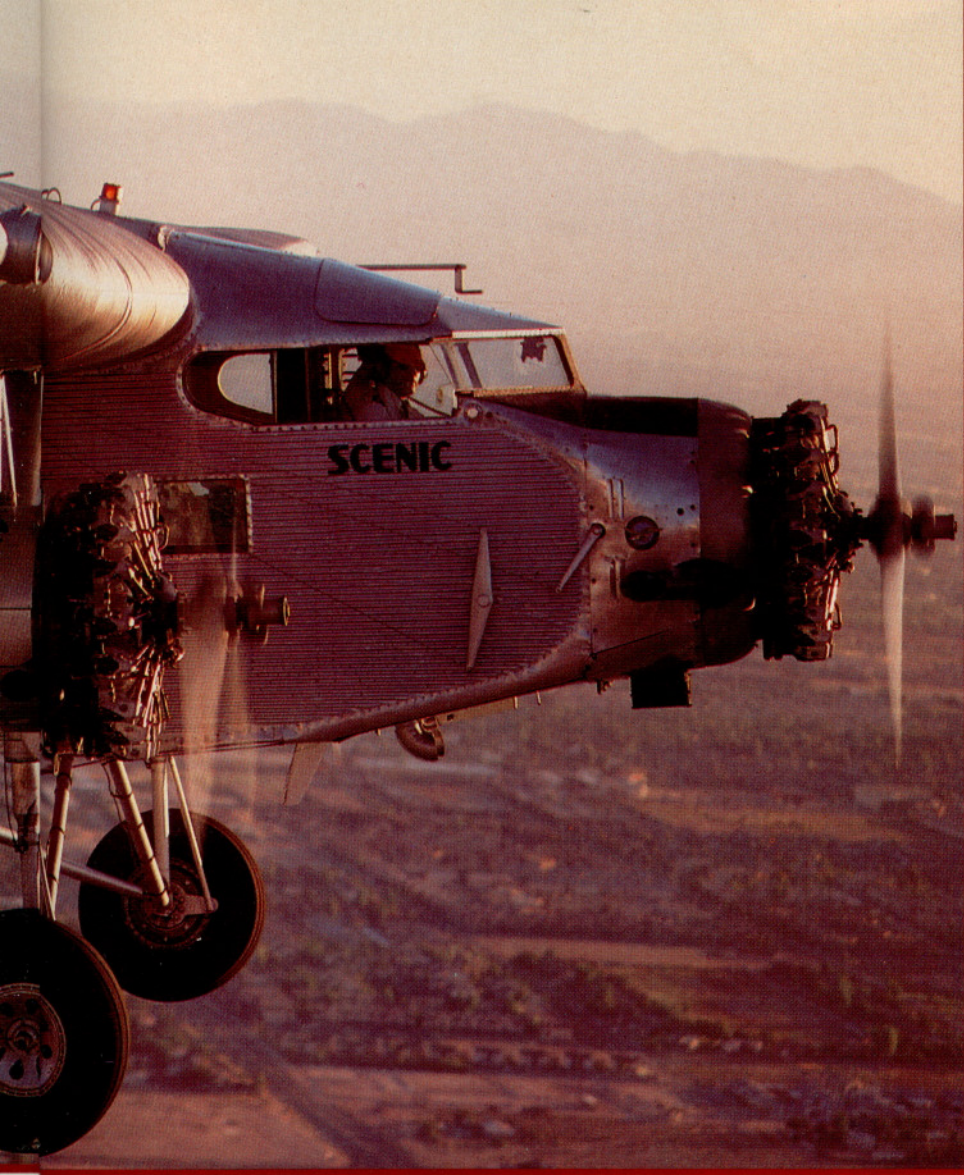
When viewed up close, the Ford has a face only a lover could love. The first impression is one of size and a myriad of lines and shapes. N414H, serial number 74, has a wing span of 77 feet 10 inches, a length of 49 feet 10 inches and a height of 13 feet 8 inches (but it seems like a tall building when crawling out of the hatch on top of the cockpit and onto the wing to dipstick the fuel tanks!). Corrugated Duralumin as far as the eye can see in all directions. Notwithstanding her bulk, the airplane is not as heavy as one would think: 9,188 pounds empty and up to 13,250 pounds max.

Considering her date of birth, 1929, there are darn few wrinkles or blemishes, especially when compared to those of us of comparable age.

And she is hell for stout! I was told that none of the 199 Trimotors built ever had an in-flight airframe failure. This includes those that were looped, rolled and spun in air shows, those that hauled ore out of the mountains of South America, those that carried smoke jumpers into the forest fire areas in the Rockies, those on floats up north and all those that slogged back and forth across the country pioneering the first truly successful transcontinental air service. This is truly a tribute to the skills of Bill Stout and the others who designed the machine and to Henry Ford for having the vision to produce the Trimotor in large numbers.

N414H has had an interesting life. She started out on floats on the Detroit River as Henry Ford's personal aircraft,





After nearly a half-century of hauling freight and passengers, N414H has retired, to be flown only on special occasions. Below, the Trimotor rests between training sessions on a desert strip, pilots Stu Carson and Bernie Godlove aground, John L. Baker "aloft."



went to Pan Am in 1931 and flew out of Miami into Central America and then was sold to a South American airline in 1940. She came back to Pan Am in 1941 and was sold to Aerovias De Guatemala, in whose service she hauled cargo until 1951. At that time she was sold to American Airlines, which used the aircraft for promotional tours until Chuck LeMaster bought her in the early 1970s. The airplane barnstormed until Chuck retired in 1977 and then went to her present owner, Scenic Airlines. The Tin Goose went right back to work hauling passengers out of the 7,100-foot-high Grand Canyon National Park Airport. She would labor there through the summer months and then be brought back to Las Vegas by Scenic to do evening flights over the city through the winter. Now she is a lady of leisure, sitting on her own hard-stand by the Scenic hangar and flying only on special occasions and by the few lucky ones (such as me) who are judged to be qualified.

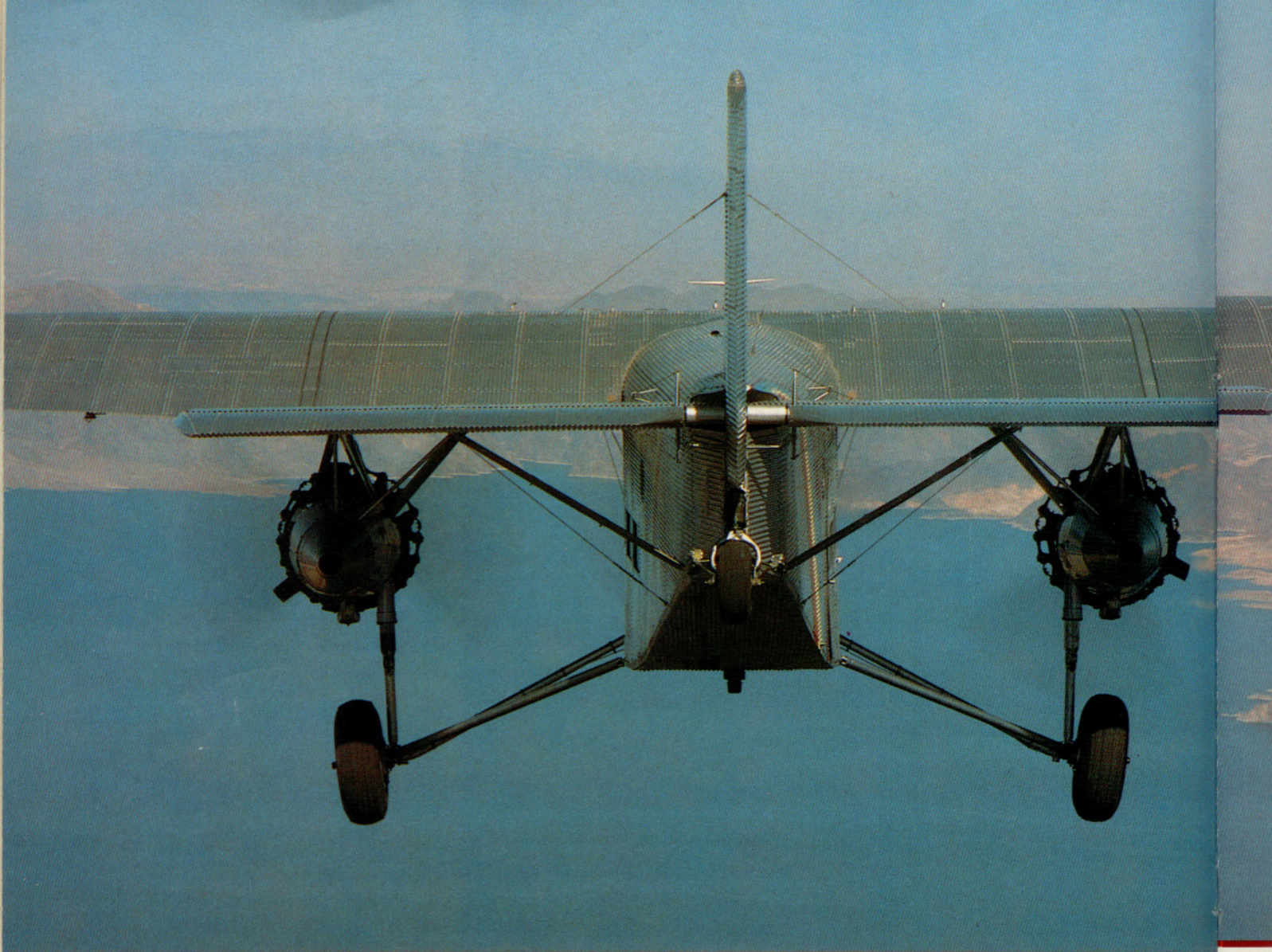
N414H is a 5-AT, the big Trimotor with three Pratt & Whitney R-985 radial engines that each develop 450 horsepower at takeoff power. The earlier 4-AT is smaller overall and uses 220-hp Wright Whirlwinds.

This is not an airplane for a "kick the tires and light the fires" preflight. The walkaround is formidable. Not only is there a lot to check, but some of it is in the damndest places. You need ladders, gymnastic skills, a strong back, no strong aversion to oil and grime and a good set of overalls, work shoes and gloves.

Of course, this gentleman flyer showed up in white buck shoes, yellow pants and a white, short-sleeved shirt! I got things on them that industrial-strength solvents won't even touch, but the dirt did tend to mask the burns I got over every inch of unprotected skin whenever I touched the airframe that had been baking in the 110-degree heat.

The walkaround starts at the main door on the right rear of the fuselage with a check of the paperwork and then continues with a climb up the aisle to check the cockpit.

The empennage is pretty much standard, with the exception of the tailwheel. First, it looks like it could support a John Deere tractor (and I'm sure it would), but the fact that it is swiveling and non-lockable makes the inspection of the bungees of the highest importance. This takes on added significance because the night before I had been ad-



vised that a high percentage of destroyed Trimotors met their ends during ground loops on takeoff.

An interesting challenge is removing the three tiedown anchor chains from the landing gear. The heavy chains are necessary because a number of Trimotors have ended up on their backs in strong winds due to their large wing areas.

Inspection of the fuselage and wing are standard—until you come to the wing baggage lockers. Now you understand what the big long pole under the seats is for. It looks exactly like the long awning cranks that once were used to crank storefront awnings up and down. After climbing a ladder and pulling a latching pin, an arm drops down under the center of the wing just outboard of the nacelle. Insert the pole, crank like crazy and down from the lower wing surface descends a cage. Each wing's cage can be lowered to ground level and filled with up to 400 pounds of baggage or mail.

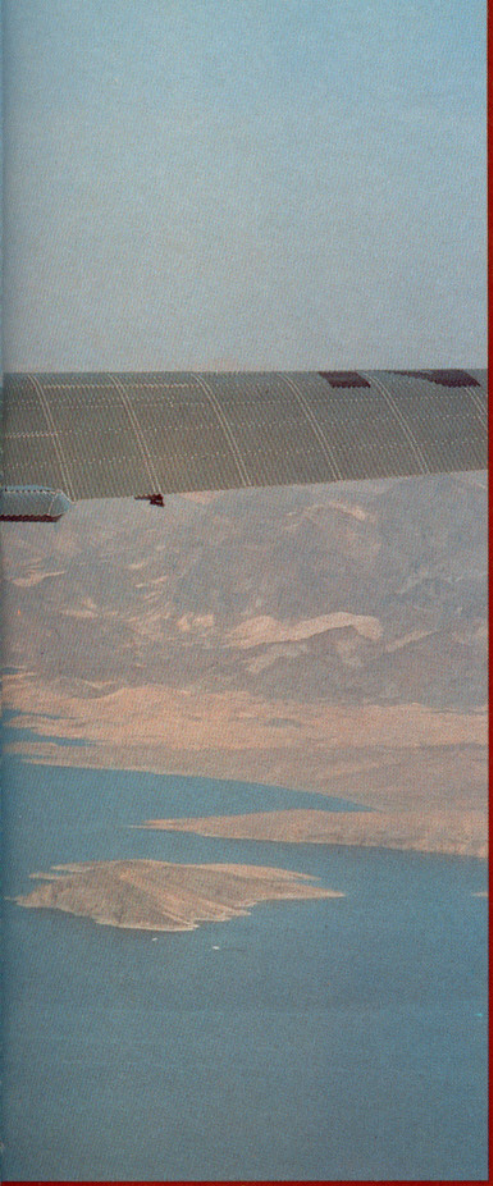
*The Ford's monstrous
corrugated wing skins, if
rolled flat, would
produce a wingspan
nearly equal to a 727's.*

Now comes the fun part. It is time to check the number one (left) engine. After pulling the props through and inspecting them for nicks, you check the oil, contained in a 10-gallon tank . . . above your head. But not to worry, because soon you will be draining the fuel sump, and the avgas will rinse all the oil from your hair. (One of the great mysteries of aviation has always been how to tell when you have an oil leak in a radial engine. Having flown a number of radial-engine machines in the military, I was prepared for the quandary.) There is oil everywhere. I have always assumed that things are okay as long as

there is not a lake-sized puddle on the ground and there is a sizable quantity of oil remaining in the tank. This was the case with all three engines. Checking the oil on number two (the center engine) calls for a different procedure. You must go through the cockpit, out the overhead hatch, shinny out over the windshield and straddle the nose to reach the dipstick to verify the level in the seven-gallon tank.

One thing about draining the fuel sumps: This is much like a session on a jungle gym. Hoist yourself up on a gear leg and grab one of the struts running to the nacelle. Stand on your tiptoes and reach as high as you can to open the sump drain door. Then drain the sump. In addition to cleaning your hair, that fuel cools you right off as it drains on your head and shoulders. Certainly cuts down on the urge to smoke.

Now that you're cooled off, you can finish the walkaround, and if you are still up to it, it's time to go flying. And what a thrill. I have flown the first su-



fuel valves are behind the copilot's head and the left engine's valve is behind the pilot's head. A check of the fuel sight gauge requires going back into the cabin, opening an overhead panel and sticking your head into the wing center section (with a flashlight) to determine fuel quantity. There is a maximum total of 355 gallons in three fuel tanks.

The start is about the same as for other big radials. Master, On; fuel, On (although there are three tanks, all engines feed from a common fuel manifold, and there is no crossfeed capability); mixture, Rich; prime, as required, which is about 45 seconds on the outboards because all three engines prime from a central hopper tank, and there is about 20 feet of fuel line to the outboard engines. The center engine requires 20 to 25 seconds of priming. Start the center engine first because it drives the airplane's sole generator. Turn about six blades and then mags On and ignition boost On. Prop levers are kept full back (high pitch-low rpm) until the engines are running and the oil pressure stabilizes, then moved to the low pitch-high rpm position. All of this is accompanied by large clouds of white smoke and ever-increasing noise.

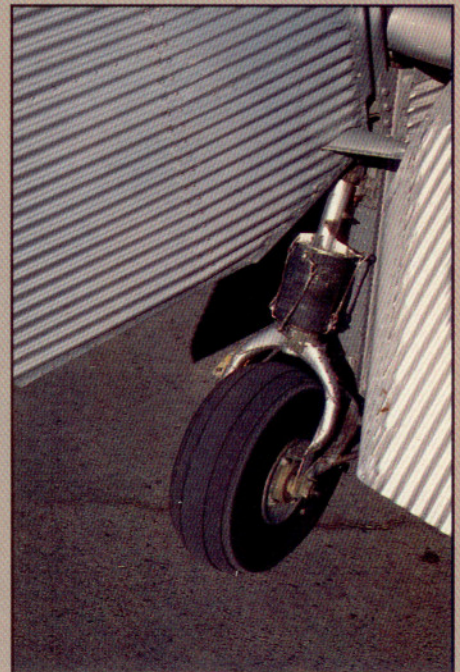
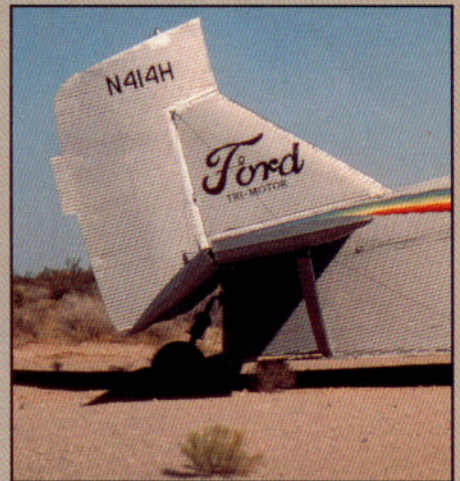
Now we have to figure how to get this big monster out of the parking spot and headed for the taxiway without crushing a whole row of Mooneys and Cessnas. Up with the throttles to get it moving, then off with the left engine and tap the left brake. Then quickly in with the left engine to stop the turn and away we go, very cautiously.

My kingdom for a steerable tailwheel. There are several trips up and down the taxiway to get a feel for the lead and lag when taxiing a big taildragger with throttles only. Then on to the run-up area adjoining a wide runway with no obstructions on either side. (The sister ship to N414H was totaled in the ditch paralleling 19 Right when it was ground-looped on takeoff.)

Runup is pretty much standard, and after running through the challenge-and-response check list, we're ready to go. Talk about excitement. Imagine sitting in the left seat of this very unusual airplane without the slightest inkling of what it will feel like once we start accelerating. While I have the confidence of every old fighter pilot that "I can fly the box it came in," the butterflies started to flail about in my stomach at a pretty good rate because I knew I was flying history as well as an airplane. It would

personal jets, Mustangs, A-26s, ultralights, Lears and Pittses, but never have I gotten the kick I did from the Ford. Once you settle in the cockpit, the high begins, and so does the serious business. Captain Godlove is no longer Bernie. The check lists use the challenge-and-response format, and you had better be correct and concise.

Ergonomics was clearly not a science that was practiced when the Ford was designed. Rube Goldberg was more in fashion. There is stuff stuck everywhere except where you would imagine. The elevator (and only) trim control is over the door into the cabin area. Two carburetor heat controls are on the rear bulkhead behind the captain's left shoulder, and the third is on the upper left of the instrument panel. The two manifold pressure gauges (left and right engines on one gauge and the center engine on the other) are directly behind the pilot's yoke. The artificial horizon is lower center on the panel, and rate of climb is upper left. The right- and center-engine



sure be bad form to bend it!

Just before we take the runway, I run through in my mind the various dos and don'ts. Begin at a full stop on the runway. No running takeoffs because that is ground-loop-city if one of the outboards doesn't power up equally with the other. Let the tail come up by itself; don't push forward to hurry it. Back to climb power as soon as practical because even with the best noise-attenuating headsets, you can't hear the tower or the intercom at takeoff power.

If an engine fails at or below V1 (critical engine-failure speed—80 mph), abort. If it's an outboard engine, pull the other outboard and then off with the center engine when you get things under control. Vmc (minimum control airspeed with an inoperative engine) is 75 mph with the critical (left) engine out. After V1 you can take off, but if adequate runway remains it is best to stop. V2 (takeoff safety speed) is 81 mph.

Cleared onto the runway. On to centerline and stop. Bring all three engines up to 1,500 rpm. Everything in the green, and I release the brakes and advance the engine levers smoothly up to takeoff power, 36 inches manifold pressure and 2,300 rpm. Very quickly the tail comes up, and my feet are down the pedals and off the brakes. Some right rudder is needed, but the elderly lady is gentle as can be and heads straight down the runway. Don't let her fly before 80. At 80 I add very little back pressure and we are flying. Stay in ground effect until reaching 90 mph, the magic number. Best engine-out climb speed is 90, and that is *absolute!* She won't climb at 88 and she won't climb at 92. So speed control becomes one of the major



focuses when flying the Trimotor.

At four hundred feet, I come back to climb power of 30 inches and 2,000 rpm. That is a challenge, what with the manifold gauges behind the yoke and the needles wandering all over the place. The rpm needles also kind of wander, and it's so damn noisy you can't tell whether they are synchronized or not. Now the noise level comes down to a deafening din from the "inside a bass drum at a rock concert" level at takeoff power.

Wonder of wonders. The ugly, waddling duckling on the ground has become a swan. This machine wants to fly. Not fast, but smoothly. We climb out to

Obscured not by the mists of time but by droplets of oil, the Trimotor's wind-screen needs regular cleaning, even in flight. Below, Carson and Godlove supervise refueling. Carson holds the fuel cap 'wrench,' made from a 2 × 4.





immediately stopped by coming up with the power. There was no loss of altitude. It is all a whole lot of fun.

We have been gradually working our way south towards a dry lake which sits astride the L.A.-Vegas highway. This is where we are going to shoot some landings. While letting down, the inevitable happens—engine out! Of course, it is the critical engine. The left engine's power is pulled back, and very soon I understood why I was briefed to put both feet on the same pedal when flying with an engine shut down. No one can describe the amount of muscle required to hold the ball in the middle with the two remaining engines at climb power. So there goes the white shoes. It is hard to explain to someone why the left shoe is pristine white and the right one has a flat toe and footprints all over it. The temptation is to stand on the pedal to get a little more leverage. At the same time we are trying to hold about a 10-degree bank away from the dead engine.

After some descending turns, Captain Godlove powers up the left engine and I begin to shoot landings. And shoot landings. And shoot landings. After the first few, all the rest are with a simulated engine out, except for several with two shut down. This is a real challenge because the best the Ford will do with two inoperative engines is a descent rate of about 700 feet per minute. This procedure must be demonstrated on the type-rating checkride under the 50-percent power requirement rule. One-third power is the best you can do in a Trimotor.

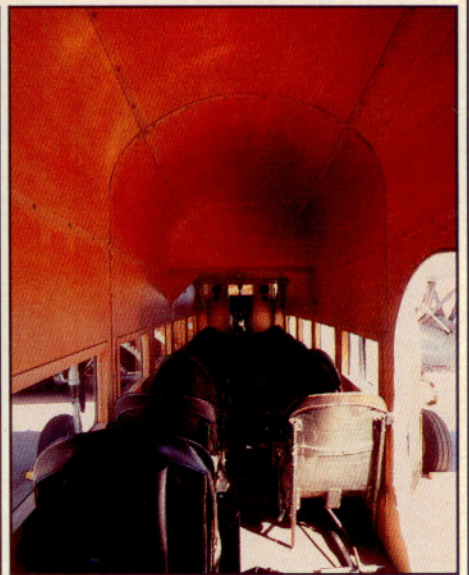
The landings are a kick. They are all wheel landings because you can't get the tail down for three point landings

the south of Las Vegas to 6,500 feet to get a feel for the airplane. Cruise power of 25 inches and 1,850 rpm gives you 105 mph IAS.

I was warned that the Trimotor was a "rudder" airplane but had no idea of how that would translate. When looking at the barn-door-sized ailerons, it is no surprise that adverse yaw is fierce. To keep the ball anywhere near the middle of the instrument, any turn requires several yards of rudder. In this respect, N414H flies a lot like an overgrown Cub. It is very slow on aileron response, needs a lot of rudder to stay coordinated and is relatively light on the elevator when properly trimmed. However, the

equation changes when the maneuvering becomes more aggressive. Steep turns require climb power and a lot of muscle. Turning left, the torque tends to pull the nose down so you must put the top left cylinder of the center engine on the horizon. The reverse is true in turns to the right, and after about 90 degrees of turn you need both hands on the yoke, unless your avocation is weight lifting.

Slow flight is no problem, as N414H doesn't want to stall. To do stalls, the nose must be pulled way up. With power back, nothing happens until the airspeed drops to around 64 mph. Then there is a very gentle break which can be





Scenic Airways President Alan Stephen presents John Baker with his certificate of completion.

without pre-loading the tail with nose-up trim. All this nose-up trim required for three-pointers, however, can create an insuperable problem with pitch-up forces in the event of a go-around.

After getting used to the airplane's height above the ground, one good landing after another is almost routine. Simply carry a little power and 90 mph. As you get close to the ground, start pulling back power on the two outboard engines. Upon touchdown (which is surprisingly soft as a result of the humongous wheels and soft tires), back off the center engine and maintain directional control with the rudder. When the tail comes down and you start to lose rudder control, gradually inch your feet up the pedals to the brakes. Just remember, no brakes until slowed to taxi speed. Despite the ground-loop horror stories, I found the airplane to be honest, and

never once did she try to head for the weeds on me, even in a pretty good crosswind.

I shot almost 30 landings over the next two days, including a couple of thrillers into a short gravel sailplane strip, accompanied with the standard built-in crosswind. While the landings are sporty, two-engine go-arounds or engine failures after takeoff are a real challenge. About eight yards of rudder and absolute, non-negotiable airspeed control are musts. Ninety miles per hour, period. On the first few engine-out climbouts, I allowed the speed to wander, and instead of the advertised 200 feet per minute climb, even the slightest variation of airspeed resulted in either no climb at all or a gradual altitude loss. Experiencing this regime of flight, one's respect for the people who flew the Trimotors on revenue flights can only

grow. A heavy airplane with full fuel, 13 passengers, baggage and high density altitude would certainly separate the men from the boys in a real hurry.

After each flight there was a thorough debriefing, all with a view towards preparing for the type-rating ride.

As my time in N414H grew, so did my confidence. The Trimotor is that kind of an airplane. You become friends and partners in very short order. She is honest, straightforward and has no pretensions. The checkride itself was almost an anticlimax.

After an hour-and-a-half oral examination (following half a night doing a weight and balance problem), it was time to fly. My early concerns had all but vanished. The fear of a 100-foot altitude deviation, a five-degree heading change or any airspeed deviation resulting in a busted check was unfounded.

After nearly 11,000 hours of flying, one of the proudest entries in my logbook is the entry of June 12, 1987, relating to a type-rating ride in Ford Trimotor N414H that states "Excellent Flight." And it was!

Was it worth several ruined sets of clothes, 20 pounds sweated off in the 110-degree heat, assorted scratches, bruises and burns and further degradation of already questionable hearing acuity? Well, let me warn you that if you're in Vegas and a somewhat mature gentleman in work clothes, industrial boots and aviator glasses comes up and offers you the thrill of a lifetime, he may be offering to introduce you to a beautiful woman. It may well be me trying to find some folks to share the cost so that I can go back and renew my love affair with N414H. □

Ford Trimotor 5-AT

Constructor's serial number 74

Operated as NC-414H, LG-AFA, XA-BKS, N414H

First flown September 4, 1929

Price new: \$55,000

Current market value: not available

Specifications

Powerplants	Three Pratt & Whitney Wasp Jr. 985 AN-1, 450 hp
Propellers	Hamilton constant speed 2D30-237
Length	49 ft 10 in
Height	13 ft 8 in
Wingspan	77 ft 10 in
Wing area	835 sq ft
Wing loading	16.1 lb/sq ft
Power loading	9.25 lb/hp
Seats	15 + 2 crew
Empty weight	9,188 lb
Gross weight (single pilot)	12,500 lb (13,250 lb under special conditions)
Useful load	3,312 lb
Payload w/full fuel	2,130 lb

Fuel capacity, std	355 gal (355 gal usable in level flight)
Oil capacity, ea engine	27 gal
Baggage capacity	1,240 lb

Performance

Rate of climb, sea level	1,100 fpm
One-engine-out ROC, sea level	200 fpm
Max level speed, sea level	144 mph IAS
Normal cruise	105 mph IAS
Service ceiling	17,500 ft
Absolute ceiling	18,800 ft

Limiting and Recommended Airspeeds

V _{mc} (min control w/left engine inoperative)	75 mph IAS
(min control w/two engines inoperative)	
V ₁ (critical engine failure)	85 mph IAS
V ₂ (takeoff safety speed)	80 mph IAS
V _{ne} (never exceed)	173 mph IAS
V _s (stall speed)	64 mph IAS

All specifications are based on approved airplane flight manual. □