Cessna Skymaster:

An unconventional twin that's not exceptionally fast, but engine failure can be a non-event, thanks to centerline thrust.

The idea of the push-pull twin makes such fundamental sense that it has been applied to aircraft designs in one form or another for nearly 100 years and in literally dozens of models you've never even heard of. Back in 2005, Adam Aircraft tried the idea again with the A500 push-pull piston twin. Like many before it, it failed more by market reality than by a fundamental flaw in the idea.

Then there's the Cessna 337, arguably the most commercially successful push-pull attempt, at least in terms of numbers built. And although the 337 Skymaster isn't the most popular twin ever marketed, it's done all right for itself and has achieved its primary goal: eliminating asymmetric thrust and simplifying the pilot's workload in the event of an engine out.

That's a 1965 337 wearing a modern paint scheme. It also has the finicky hydraulic landing gear used on the Cessna 210 Centurion, later upgraded to electro-hydraulic.

If the concept was sound, the execution of it by Cessna was a little less so. The Skymaster acquired a reputation as a bit of maintenance hog and although its performance is respectable, other twins do just as well, if not better, on less fuel and on fewer dollars spent on wrenching. Like most used twins on the market today, Skymasters are a bargain. When fuel prices started their climb eight years ago, market values of twins started downward and today, you can find a reasonably well-equipped Skymaster for under $100,000. Airframe values seem to have stabilized since we first examined them several years ago, which is more than we can say for other piston twins.

The Rocket II Pristine Airplanes refurbishment from Aircraft Sales, Inc. makes an existing Skymaster as modern as it can be. It includes a custom leather interior, a full panel of Garmin avionics and twin digital engine monitors.

SIMPLER? MAYBE

When Cessna began to develop the Skymaster in the mid-1960s, the accident history was horrid for twins. Part of that was due to training. The doctrine in those days was to actually surprise the pilot with a real engine shutdown to simulate losing one. In the hairy-chested thinking of the day, instructors would even do this on takeoff. As a result, loss-of-control accidents due to VMC rollovers were, if not common, more prevalent then they are today.

In an engine-out situation, conventional piston twins generally need to be handled with kid gloves lest the airplane get too slow and roll over on its back. So Cessna approached this problem just as other designers had going back to the Caproni Ca.1 of 1914: they aligned the two engines with the airframe centerline, offering pilots the safety of a second engine without the penalty of adverse handling. If one quits, identify it, feather it and don't worry about the dead-foot, dead-engine drill. The FAA even granted the 337 its own class rating, limiting pilots to centerline-thrust twins only. It was much easier—and probably safer—to earn a multi-engine rating in a Skymaster than in a conventional twin,

Part of Cessna's plan worked, since there's little question the Skymaster is easier to fly on a single engine than a conventional twin. But, since the VMC rollover accident doesn't happen that often in the real world because training doctrine moved to zero thrust instead of an actual engine shutdown, the airplane's overall accident record isn't that much better than conventional twins.

A pilot looking to improve redundancy by stepping up from a single to a twin certainly will achieve it with a Skymaster. But in the bargain of gaining redundancy, pilots can be forced to accept a platform with more cabin noise, a set of operating peculiarities all its own and tightly packaged systems presenting more of a challenge to maintenance personnel than if each engine resided on its own wing. All of this might argue in favor of a single-engine airplane or even a conventional twin. Then again, if you fly over the Great Lakes at night, maybe not.

[IMGCAP(5)]

MODEL HISTORY

The 337 Skymaster's front/rear engine layout and high wing started out as the fixed-gear Model 336 in 1964, powered by Continental IO-360-A engines of 195 HP apiece. Widely acknowledged as a slug, Cessna sold only 195 336s in one year of production; around 80 remain on the FAA's registry today. In 1965, the company folded the gear and upgraded powerplants to a pair of Continental IO-360-Cs pumping out 210 HP, resulting in the 337 Skymaster. Cessna sold 239 copies that year. (Not really learning from its 336 experience, Cessna flew a cantilever-winged, lower-powered version, the 327, in late 1967, but it proved too slow and the project was dropped the next year.)

To make the original 336 a retractable, Cessna borrowed the complex and occasionally troublesome hydraulic landing gear system from the 210. In 1973, it was upgraded to a simpler and more reliable electro-hydraulic system. While less complex and easier to maintain, the system still isn't as robust as, say, a Baron's or Seneca's.

Early models also came with multiple fuel tanks, another system that proved problematic in the field. It, too, was replaced in 1973 by a superior, less complicated system. A turbocharged version—the T-337B, powered by 210-HP TSIO-360-A or -B engines from Continental—appeared in 1967, but was dropped in 1972 with the addition to the Skymaster line of the almost-revolutionary pressurized 337 version, the T-337 G-P, powered by TSIO-360-C engines up-rated to 225 HP.

The turbo reappeared in 1978, with TSIO-360-H powerplants, but Skymaster sales had begun slipping by then. Cessna pulled the plug following the 1980 model year, after a total production run of 2058, plus 332 pressurized versions. In addition, Cessna built slightly more than 500 Skymasters for the U.S. Air Force. These saw extensive action in Vietnam as the O-2A. This version boasts structural beefups, hard points and extra windows. These airplanes frequently appear on the used market and may well be the least expensive warbirds available. Additionally, some civilian models were converted to an O-2B configuration for the military to use in psychological warfare.

Major tweaks in the airplane's history were few, but there were many designation changes. Beginning in 1970, some inspection panels were added—making maintenance easier—and the airframe was lightened a bit, increasing useful load. The interior arrangement also changed through the years, with various combinations of seat mounting.

As is common with any aircraft, the non-pressurized 337's gross weight crept up during its years in production. Early models started at around 4200 pounds; late ones weighed 4630 pounds, with max landing weight limited to 4400 pounds. Meanwhile, the P-337, with its 30 extra horsepower, had a takeoff weight of 4700 pounds and max landing weight of 4465 pounds.

Piston-twin prices are still a bit soft, and the 337 is no exception. On the up side, most of the depreciation has been squeezed out of these airframes. The downside? Cessna 337s can't be counted on to increase much in value. But a Skymaster is a lot of airplane for the money. Besides current fuel prices and future uncertainties, other factors depressing prices are that the 337 has a reputation for being a maintenance hog—one that's not entirely deserved—and they aren't all that fast as like-powered twins go.

Buyers should be aware, however, that buying a cheap twin is not the same as operating a twin cheaply. A hangar queen will eat through a bunch of money if it needs remedial work and, in any case, you'll need to find a shop familiar with the

breed to do the pre-buy and maintain the airplane going forward. The Skymaster doesn't perform much better than a Cessna 210, and it has two of everything to maintain and replace, driving up ownership costs.

ý

PERFORMANCE, HANDLING

Skymasters aren't speed-demons, although the turbocharged models do respectably well for pilots willing to take them into the teens. Owners of normally aspirated models can plan on between 155 and 165 knots true, depending on altitude and how much fuel they want to burn. The turbocharged and pressurized models will push 190 to 200 knots at 20,000 feet, their maximum certified altitude. At middle altitudes, 170 to 180 knots is typical for the turbo models, which isn't all that bad.

Since Skymasters have relatively small displacement six-cylinder engines, fuel burn tends to be reasonable, ranging from 15 GPH to 22 GPH total, with 19 to 20 GPH typical for a 150- to 160-knot cruise. For comparison, a Twin Comanche will do about the same speed on 100 fewer horsepower and a lot less gas. Efficiency isn't a Skymaster hallmark, except when compared to larger, faster twins.

That's Steve Bowser's 1967 T337B, top. He says it carries anything he can stuff in it. Reader Bill Scherer stuffs U.S Mail sacks in the back of a 336 in the early 1960s, bottom. The aircraft's short-field capability supported Loening Air's U.S. Mail route contract delivering to the Middle Fork of the Salmon River in Idaho's Primitive region.

All-engine rate of climb ranges from a modest 1300 FPM in the old 336 to a lethargic 940 FPM with the last 337H models. We're unaware of any other twin-engine airplane with a book rate of climb below 1000 FPM; even the old 150-HP Apache had a book climb of 1250 FPM with both engines running. On the other hand, lose an engine in a 210 and there's no rate of climb, only a rate of descent. In a 337, you should at least be able to eke out 200-300 FPM.

Like many Cessnas, runway performance is good. Landing-configuration stall speeds range from 55 to 62 knots, depending on the gross weight of the particular model—about 10 knots below conventional twins like the 310.

As a result, a Skymaster will get off the ground in less than 1000 feet at gross weight—a feat very few other twins can manage. Barrier performance is not quite as good, however; the leisurely climb rate brings the Skymaster's 50-foot takeoff figures down to the middle of the light-twin pack.

The single-engine climb rates of all the light twins tend to be very similar—200 to 300 FPM—because engine-out climb rate is a certification point around which the airplane is designed. The FAA requires a certain minimum climb, figured by a formula relating to stall speed, and the manufacturers typically bump up the gross weight to the point at which the airplane just barely meets the FAA minimum. Any excess engine-out climb capability is, in effect, wasted payload. And payload numbers sell airplanes.

What's surprising is the difference between the front and rear engines. Climb on the front engine only is about 50 FPM less than on the rear, but not necessarily for all versions of the Skymaster. Reader Robert Prader told us his research reveals that later models have better front-engine performance. "It is true that front and rear engine single-engine climb rates are significantly different for all pre-1973 Skymaster models; however, the front and rear single-engine climb rates are not significantly different for the pressurized models and the 1978 and later turbo models," he said. "If you consult the POH for any pressurized model, you will find that a single-engine climb rate of 375 FPM is listed for a standard day at sea level at gross weight, with no mention of which engine is out. If you consult the POH for the 1980 non-pressurized turbo model, you will find it specifies a climb rate of 335 FPM for the same conditions, again with no mention of which engine is out."

While leaving the gear down produces a climb penalty of a bit over 100 FPM, raising it carries a temporary 240 FPM hit. (Praeder told us this is about average for most twins and probably for single-engine retracts as well.) This is because Cessna's complicated gear door arrangement adds drag while the gear is in transit. In an after-takeoff engine-out situation, it may be better to leave the gear down, just as it is recommended in some singles to leave it down until obstacles are cleared.

In normal flight, the Skymaster has typical Cessna handling: heavy in pitch, reasonably responsive ailerons. (The P-model has especially light ailerons.)

Pilots praise its IFR stability.

The noteworthy aspect of the Skymaster's handling—indeed, the whole reason for the airplane's existence—shows up when an engine fails. Instead of the normal yaw-roll-stall-spin scenario too often following engine failure in "conventional" twins, the Skymaster continues to fly straight ahead. An unprepared or rusty pilot can take his time and concentrate on the task of identifying and feathering the prop on the failed engine, without worrying about losing control.

PAYLOAD, RANGE

A Cessna press release from the 1970s describes the Skymaster as "a full six-place airplane with nearly a ton of useful load."

Good luck with that. At best, the two rear seats can accommodate youngsters. And that press release conveniently forgot when the fifth and sixth seats are installed, there's no baggage space, nor is there a baggage door. Consider the Skymaster a roomy four-placer.

Real-world useful loads run around 1500 pounds—not bad at all, and several hundred pounds more than a Twin Comanche. Standard fuel is 93 gallons, which should leave more than 900 pounds available for payload; plenty for four passengers and their bags. Standard fuel is just adequate, however—unless you throttle back—providing a bit more than three hours with IFR reserves at fast cruise.

The retired O-2A Skymaster, top, worked well as an observation aircraft. It replaced the O-1 Bird Dog in the mid 1960s. Want one? They're out there for resale.

Pre-1973 airplanes with long-range tanks had a four-tank fuel system; later ones came with a two-tank system. The long-range tanks—150 gallons in 1975 to 1980 models, 131 gallons in earlier models—solve endurance limitations nicely, at the expense of payload, of course. One owner told us that with long-range tanks full, he has seven-plus hours at 150 knots with 650 pounds of payload (three people and bags). Not a bad compromise.

Oddly, the P-337 is allowed only five people; it was certified under different rules requiring an emergency exit in a six-seat airplane. Rather than put in the exit, Cessna simply limited the seating to five. Early P models had a middle seat hinged up and to the side to get at the back row, but these seats didn't slide fore and aft. Access to the rear seats in other Skymasters requires an awkward scramble over the center row.

The Skymaster's visibility is excellent—about as good as it gets in any light airplane, single or twin. The view down is unlimited, of course, and the wing's leading edge is back far enough that it doesn't block upward vision, either, as with most Cessna singles. Good visibility is not only a safety feature; it adds to the feeling of roominess in the cockpit.

The Skymaster is also quite noisy, since the passengers are sandwiched between the engines. Also, sympathetic vibration can be a problem, particularly without prop synchronizers. Conventional twins are quieter by far.

MAINTENANCE

The Skymaster was the most complex aircraft ever engineered and manufactured by Cessna's Pawnee Division, which otherwise built only Cessna singles. Evidence suggests the division simply wasn't up to the task, particularly in the 1975-1980 period when production was growing rapidly and Cessna was plagued by an epidemic of design, engineering and production problems.

For example, the pressurized Skymaster was initially such a disaster that the first year's production was recalled to the factory for complete remanufacture and modification. Distinct from other twins, Cessna had to pack everything into the fuselage, not having the luxury of sticking systems out in the wings or into the nose. As a result, access is difficult and it is those systems where most maintenance problems will be found.

The basic airframe is stout, with a rugged strut-braced wing. There are remarkably few ADs on the airplane. And remember that the military version of the Skymaster did plenty of rough duty in Vietnam, often flying home with bullet holes or worse.

Still, a potential Skymaster nightmare is runaway maintenance costs, particularly in the turbo and pressurized models, so the prudent purchaser will closely examine logbooks and service records of any aircraft under consideration.

MODS, GROUPS

The Riley Rocket was a popular Skymaster mod and included upgrades to 310-HP TSIO-520 engines, intercoolers, three-blade props and air conditioning. Rockets come on the market now and again, at a premium price over stock

models.

Ohio-based Aircraft Sales' Pristine Airplanes modification (www.pristineairplanes.com) offers the Rocket II full refurb for the Skymaster, while adding intercoolers to P337 models, plus new avionics, paint and interior on all models. Including the aircraft, a fully refurbed Rocket II could top $600,000, but like all of the other refurbished aircraft the company pumps out the end result is a like-new aircraft, following almost six months of intense rework.

Other 337 mods include vortex generators from Micro Aerodynamics (www.microaero.com) and intercoolers from American Aviation (www.americanaviationinc.com). Both Horton (www.hortonstackdoor.com/stolcraft_description.htm) and Sierra Industries (www.sijet.com) apparently still offer STOL kits and other aerodynamic mods. A wing spoiler kit is available from PowerPac Spoilers (www.powerpacspoilers.com).

Aviation Enterprises (www.cessnaskymaster.com) offers a wide range of major modifications for Skymasters, ranging from air conditioning, airstair doors, extended wingtips, IO-550 engine conversions—for one or both engines—long-range fuel and MT propellers. The company also can provide various parts, including cargo pods. Similarly, RT Aerospace (www.rtaerospace.com) offers several items of interest to the Skymaster owner, including a convertible rear seat for the baggage area.

Cessnas seem generally blessed with good owner organizations, perhaps because the company abandoned the piston market in 1986 and stayed out of it until 1997. The clubs and groups have proven to be as good as it gets when it comes to support.

Every Cessna owner should join the Cessna Pilots Association (www.cessna.org). The organization offers the usual benefits, including an insurance program, monthly newsletter and fly-ins, and has a wealth of Skymaster-specific information. Two useful if unofficial Skymaster Web sites are the Cessna Skymaster Web Site (www.skymaster.org.uk) and SOAP, Skymaster Owners And Pilots (www.337skymaster.com).

ý

OWNER FEEDBACK

My 1974 P337 is my first pressurized airplane and as many friends have said, once you own a pressurized airplane, you can never go back. I'm sure they're right. The 20,000-foot ceiling is just fine for my needs as I fly between 15,000 to 17,000 feet on a regular basis. At those altitudes, the airplane makes book numbers and for a 40-plus year old airplane, that's pretty impressive.

I see roughly 182 knots true on 10.6 GPH running lean of peak and 11.6 GPH running rich of peak. That's about 65% power either way.

At 7000 feet I still have a sea-level cabin and at 17,000 feet I have a 7500-foot cabin. There is no fatigue after long, high-altitude cross-country flights. Even after using oxygen during similar missions in previous turbocharged airplanes I've owned, I was always a bit fatigued afterwards since I didn't always concentrate on my breathing and I was desaturating more than I would like.

I love the pressurization and I love the air conditioning. Being in Tucson, Arizona, air conditioning is wonderful and the system in my P337 works really well. I had a Piper Seneca with air conditioning that lacked this quality of both air volume and cold air. Of course all pressurized airplanes are turbocharged and mine also has the Riley intercoolers. It also has a Riley STOL kit that makes short takeoff and landing distances and speeds very manageable.

If you manage a TSIO-360 engine properly, they can do very well. On my previous Seneca I had 1600 hours on the engines (they have an 1800-hour TBO) when I sold it and they were running perfectly. On my P337 I have one engine at 1500 hours (1400 TBO) and the other at 100 hours and both are near perfect. Compressions are great, oil analysis is fine and neither engine uses any oil between the 25-hour intervals that I change it.

The 18,700-foot single-engine service ceiling is very comforting. If you lose an engine, there is no adverse yaw and essentially you're now flying a 182RG. The P337 is extremely stable and easy to fly, while the pressurized version has an extremely quiet cabin.

The annual inspection is in a few weeks and my IA said to expect it to be under $4000 (for the inspection only, of course), which for a turbocharged pressurized twin isn't bad at all. Insurance at $2000 per year is also quite reasonable and the insurance-mandated transition training was only five hours of dual instruction. Other pressurized twins I considered had requirements of up to five days of formal schooling, which would have effectively increased my insurance rates by thousands of dollars.

Ken Reed
via email

In Canada, a multi-engine center-line thrust rating is required to fly the Cessna Skymaster. We recently completed this training at Discovery Aviation in Sudbury, Ontario Canada (jason.fogg@discoveryair-fs.com is a training contact). Discovery Aviation has 18 Skymasters, which are used for fire surveillance. The training was excellent.

The difficult aspect of the Skymaster training was responding to the loss of engine on an overshoot. The single-engine climb rate (285 FPM at sea level, 20 degrees C and at maximum weight) is only achievable once the inoperative engine is feathered and the airplane is in the clean configuration. In practice, we found that any delay to feathering the engine or variation from the single-engine best climb airspeed would result in a slow descent. Lifting the gear during an overshoot adds significant drag, which has to be carefully managed.

Michelle LaPointe, Pat O'Cain
Kincardine Ontario, Canada

I am on my second Skymaster; the first I had about five years and this current one about 10. The present one is a 1967 T337B with about 3660 total hours. The front engine has 825 hours since overhaul and the rear 2450 hours since overhaul. The biggest positive features are, one, that it can carry just about anything I can stuff in it, and two, is that it has two engines. I live on the far north coast of California and there are serious mountains in three directions. I have limited experience in Cessna 182 models, but the flying qualities seem similar.

I normally cruise in the mid teens and see a total fuel flow of 18 GPH there with 160 knots true airspeed. Insurance has cost me an average $2152 per year based on a hull value of $55,000. Parts and labor have averaged $8644 per year, with a high year around $15,000 and a low year just over $2000.

I have been a member of the Cessna Pilots Association since I got the first Skymaster and have benefited greatly from the organization. I also have been lucky to have a local IA who has plenty of experience with Skymasters.

Steve Bowser
via email

The first Skymaster that caught my attention blew over my house at 200 feet one morning spraying for mosquitoes. If you've ever been lucky enough to witness a low pass from a Skymaster you'll never forget it. Because the disturbed air from the front prop washes over the rear prop, they make a unique sound and are easily identified when you hear them coming.

Like the military O-2 version used in Vietnam for recon and forward air controlling, this is a plane you don't have to be gentle with. There was even one used on the airshow circuit for aerobatics a few years back. Other than civilian use, because of their high utility and excellent visibility, many foreign countries still use the Skymaster for military operations. They're also used for many governmental operations such as surveillance, aerial surveying platforms for oceanic and firefighting activities and mosquito control chemical dispersion.

Because they are a love-it-or-hate-it airplane, the market band is narrow so prices are low. Likely due to the aging of the fleet and economic conditions, they are selling for almost 50 percent less than they were 10 years ago. I have personally owned six, and will say I have never met a person that owned a Skymaster that didn't love it. All the criticism I've ever heard came from non-owners simply because they are traditionalists who don't like the look or believed some of the unfounded rumors. Always a head turner and conversation starter, I've had many people visit me on the ramp who just wanted to take a closer look or say how cool they always thought they were.

Neglected 337s can be found from $20,000 to $40,000, but airframes that are well-maintained have decent paint and interior with updated avionics easily push these prices over $100,000. When it comes to maintenance, Skymasters share the same issues as other aging aircraft. They aren't much different than maintaining any other light twin, especially if your mechanic is familiar and you're not paying for the learning curve. The problem with many Skymaster is they're bought by people looking for a cheap twin without the money to maintain or fly them regularly, so the airplane lives on the ramp and wastes away in the weather.

The upside—since they are relatively inexpensive to acquire—it leaves lots of room left over for avionics upgrades or to get a handle on neglected maintenance. They are roomy, solid, capable, stable workhorses with great visibility and plenty of power. I bought my current one, a 1969 turbo model from the original owner who routinely flew at FL290 (its certified ceiling utilizing the onboard oxygen system) to catch the big tailwinds when they were in his favor. The old rumors of not being able to fly on one engine or rear engine overheating are just rumors, which probably started with the first model, the

fixed-gear 336 introduced in 1963, but quickly remedied with a redesign into the 337 Super Skymaster in 1965. I live in hot, sunny Florida and have never had an issue with the rear engine overheating as long as the front engine is running and providing airflow to the rear engine. With asymmetrical thrust they fly straight as an arrow, kind of like a single, but with the full redundancy and safety of two engines, dual vacuum pumps and dual hydraulic pumps.

The turbo models can fly close to 18,000 feet on one engine because they don't have the rudder deflection creating drag like you would in a conventional twin. Their safety record is similar to other twins but many Skymaster crashes are attributed to fuel mismanagement—which isn't an issue if you take the time to understand the fuel system. The fuel system was simplified starting with the 1973 models by eliminating the need to manage separate auxiliary tanks. Because of the center alignment of the engines, one should be conscious of picking up debris with the front prop and throwing it into the rear. This isn't the plane to operate off from gravel or unimproved runways. Insurance seems reasonable, but since I've never owned a conventional twin I'm not sure if it's less for the Skymaster due to the asymmetrical thrust and less risk involved when losing an engine.

The airplane is capable of carrying five or six passengers depending on the model, although it might be best to remove a rear seat and use the space for storage or luggage (or get one with the optional cargo pod.) It does make for a very comfortable four-seat aircraft. Performance and fuel consumption is reasonable with the two Continental engines. Typical cruise is 150 knots on 22 GPH. In the case of my nonpressurized 1969 turbo model, you've got an aircraft capable of hauling over 1700 pounds into the flight levels with a true airspeed of nearly 200 knots if you don't mind wearing an oxygen mask.

A fellow named Bill Crews in South Carolina exclusively markets Skymasters, which can be found on his site at www.Skymasters.com. Crews is perhaps one of the most knowledgeable Skymaster people around. There is also a Skymaster Owners and Pilots Association (SOAPA) site, which archives a vast amount of information and has ongoing blogs on the aircraft. If you're in the market for a nice capable twin that won't break the bank and lucky enough to find a 337 that's been well-maintained and with an upgraded autopilot and avionics, take a hard look at it. Make sure you have your prepurchase inspection performed by someone familiar with Skymasters.

Jim Smith
Jacksonsville, Florida

Click here