

## Turn Left at Cloud 109

If the makers of the Cirrus SR20 have their way, the professional classes of the future will avoid hub-and-spoke air travel, and perhaps even the daily commute, by flying the family plane. By JAMES FALLOWS Photographs by PAUL SHAMBROOM

**O**n a business trip this fall I had what is becoming the standard airline experience. Nine p.m., arrived at Detroit's main airport, then waited until 10 p.m. for the baggage to appear. Next night's flight out of Detroit was delayed two hours -- and eventually canceled, around midnight, followed by a stay at the airport hotel and a 6 a.m. departure. An air trip from one off-the-main-route location (Allentown, Pa.) to another (Hartford) took longer than it would have by car, because of hub-and-spoke routing through Philadelphia. Plus, there was the traveling person's toll of Dead Time: the hours lost in taxis to and from airports, in lines at the check-in counter and security gate, in the aisle of the plane itself, waiting for victors to emerge in the battles for space in the overhead racks. Need I mention mini-pretzels as meals?

I know, travel complaints are boring if they're not happening to you. And complaints of any kind can seem unfair. The airlines are so safe. Their fares can be so cheap, if you're able to book weeks in advance and not change your plans. When everything goes smoothly -- no lines, no delays, no behemoth in the seat ahead of you reclining into your lap -- it can seem miraculous to be transported so far so fast.

But while trapped on a behind-schedule plane it can be tempting to dream of another possibility. Suppose there were an efficient way to travel that departed as soon or as late as you desired and went directly where you wanted to go (rather than to the Major Airline Hub that is least-far-distant from your destination). A way that didn't involve the hours of padding time to allow for unexpected lines and hassles at the airport. A way that didn't require the Gulf Streams or other multimillion-dollar corporate jets that now spare the rich the annoyances of commercial travel.

A tiny company based in Duluth, Minn., named Cirrus Design believes that it can offer a glimpse of such a new, futuristic transportation system. The company was founded by the Klapmeier brothers, Alan and Dale. Their basic idea is to build small airplanes that ordinary people will find simple and safe enough to fly, that are fast enough to beat the airlines on door-to-door speed for short- and medium-length trips and that are inexpensive enough, relatively speaking, to appeal to those who already constitute the market for fancy cars, expensive R.V.'s and vacation homes.

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Highway in the sky: A small company in Minnesota is betting that its Cirrus SR20 single-engine plane will transform civil aviation.

The oddest aspect of the vision may be that the United States government has implicitly embraced it as a feasible next step in avoiding transportation jams. Interstate highways are saturated; the hub-and-spoke airline system is overloaded, too; trains are suited mainly to densely settled corridors like Boston-Washington. NASA, the agency best known for explorations of space, is quietly advocating an "Interstate SkyWay" network, the name conjuring images from "The Jetsons."

"A small-aircraft transportation system," says Bruce Holmes, a senior NASA official, could "satisfy a large portion of the demand for Information Age mobility and accessibility, effectively unleashing the new economy's potential for standard of living and quality of life."

But before small planes can join the car in the family garage, they'll have to seem roughly as safe as the car, especially in the wake of prominent recent crashes. On July 20, after the United States Coast Guard shifted from a "rescue" to a "recovery" mission for John F. Kennedy Jr. and the Bessette sisters, Cirrus delivered the very first model of its SR20, the plane that it hopes will begin a new era in personal transportation, to its very first customer.

**'No matter how good a pilot is, he's inevitably going to make mistakes,' says Alan Klapmeier. 'The cost of the mistakes shouldn't be death.'**

The Cirrus SR20, which was created by the Klapmeier brothers, does not have a perfect record. In March, Cirrus's chief test pilot, Scott Anderson, died in a crash as he put the SR20 through torture-test maneuvers before it went on sale. The company identified and corrected the defect that killed Anderson, a widely respected figure in Duluth, and received federal approval to go ahead with deliveries of the plane. Still, despite this disaster, the Klapmeier brothers can plausibly claim that the Cirrus SR20 is designed to be safer than any small plane now in service.

The contradictory elements of small-plane flight -- its inherent freedom and peril -- were intensified for me, as for everyone, by Kennedy's death. I had learned to fly about the time he did and took the check ride for an instrument rating four days after his crash. I had followed Cirrus's development for several years in the aviation press. The more I heard about their plans, the more I wanted to believe that they had, at last, created an aircraft that was fast and fun to fly, but exposed pilot and passengers to substantially less risk.

And so, in late September, I took a commercial flight to Los Angeles (90 minutes ground delay, air-traffic pileup at LAX), and prepared to fly halfway across the country in an SR20.

**O**n my arrival in Los Angeles I was met by two men from Cirrus, Gary Black and Tom Bergeron. Black, the company's director of flight operations, is in his mid-40's; he's tall and lanky, with short black hair and the demeanor of a Navy flyer, which he once was. Bergeron, a Cirrus salesman, is in his early 50's, with wavy hair and an aggressively friendly air. He drove us a dozen miles inland from LAX to El Monte Airport, where the plane waited.

There are roughly 4,600 public airports in the United States that are open to anyone but have no scheduled commercial flights (versus the 46 big airports that account for 75 per cent of all airline traffic, and the 660 total that airlines serve). El Monte resembled a big shopping center -- one whose main Sears or Sports Authority buildings had somehow been vaporized -- with a vast paved lot, part of which was marked as a runway. Like other small airports, it looks like the aviation version of an antique car show.

Most of the 190,000 small planes still flying in the United States are aging veterans, and the typical small airport is lined with Cessnas that were designed 40 years ago or more -- like the stolid 172 Skyhawk, with its hammered sheet metal and its old-fashioned high wing -- and have been kept running through loving maintenance ever since. They are reliable but inelegant. Small propeller planes occupy a strange economic gray zone. New ones are quite expensive -- \$150,000 and above for the humblest Cessna, half a million dollars and up for fast, fancy planes like the newer version of the Piper Saratoga that John Kennedy flew. But the great majority of sales are for used planes, typically 20 or more years old. And these can cost not much more than a fancy car or R.V. -- from \$30,000 or \$40,000 up to the high five figures.

A new Cirrus was initially priced at \$144,500, with options, and has since risen to \$179,400. In the airplane world, that is seen as cheap. The Cessna available for about the same price is much slower and less comfortable, and the Mooneys or Bonanzas that fly as fast cost twice as much. Another all-new plane soon to go on sale, the Lancair Columbia, is faster but more expensive.

There on the tarmac at El Monte, the SR20 was the general-aviation equivalent of an Audi A4 or BMW. The shape was streamlined, constructed of fiberglass rather than metal. The cockpit windows were big and bulbous, almost like those of a helicopter. The wings were low and set slightly behind the cockpit, with a little cuff, or change in the wing shape, halfway out along their length.

Gary Black opened the Cirrus's semi-gull-wing doors and got in the left-hand, pilot's seat; I got in the right. Bergeron, flying commercial back to Dallas, waved goodbye. Inside, the plane was curved and sleek, like today's best cars, using new material and geometry to maximize space and visibility.

"Most metal airplanes are made like mailboxes," says Mike Van Staagen, who oversaw the design of Cirrus's interior. "They're two-dimensional curves, and they're kind of hammered together with harsh angles." The effect of a hundred details make the Cirrus cockpit seem like a first-class seat, compared with the Aeroflot coach seat of the typical aging small plane. With a console between its leather seats, the plane has that new-car feeling. And where the classic aluminum airplane has the narrow shape of a cigar tube, the Cirrus takes a raindrop approach. The cabin is significantly rounder -- wider and taller -- but it still moves through the air with less drag. It is aerodynamic enough that the Cirrus can cruise at 160 knots (184 miles per hour) on the same 200-horsepower engine that takes a Piper Arrow only to 138 knots (159 m.p.h.). Because of its "slipperiness" in the air, it gets better gas mileage than some cars, cruising at 19 miles per gallon.



The flyboys of general aviation: Dale Klapmeier, left, and his brother Alan founded Cirrus Design in 1984.



The Klapmeiers' factory in Duluth produced the first SR20 for market last July.

**N**o one at El Monte seemed to know what this thing was: the control tower addressed each of the planes waiting to taxi by its model and number. "Cessna Two Charlie Bravo, cleared for takeoff on runway one-nine." When the controller got to the Cirrus, he said: "Uhhhh, you in the low-wing plane, follow the Cessna on takeoff. Bonanza Six Nine Sierra, give way to that other plane."

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"That other plane" pulled to the start of the runway and was cleared to go. Black smoothly pushed in the throttle lever, the Cirrus reached its rotation, or liftoff, speed of 65 knots, and we began our aerial survey of Los Angeles. The plane climbed and turned easily, controlled by a little side stick, as in a military fighter, rather than a large yoke, as in most planes. A computer panel, like one in an upscale laptop, showed us where we were at all times with a "moving map" of obstacles, features and airports ahead.

Airline travel has been so utterly drained of romance that it is startling how interesting flight can seem when you are 2,000 or 3,000 feet, instead of 35,000, above the surface and you can look all around at scenery as it comes at you, rather than just out a little pane to the side. As Dale Klapmeier put it: "Visibility is a surprisingly large part of comfort. You're far more 'comfortable' flying in an airplane you can see out of than one where you're trying to get your head up over the panel."

We headed east over the Los Angeles Basin, seeing how freeways stitched its component cities into one great sprawl, following the visible marks of fire, flood and tectonic strain. We deviated south for a few miles to fly over the town where I grew up, circling until I was sure I'd picked out my parents' house -- and then headed straight for the San Bernardino Mountains, which separate the basin from the Mojave Desert. In the clear skies, we were operating under "visual flight rules," responsible for seeing and avoiding other planes.

An hour out of El Monte, we saw the towers of Las Vegas to our left, surprisingly concentrated and small-looking in the vast desert. Airliners descended past us from overhead toward the airport. We were like scuba divers watching giant fish swim past. Over Boulder Dam, blazing white against the serpentine blue lake, the controller alerted us to the waves of sightseeing planes headed toward the same destination at the same altitude. We moved across higher terrains, toward the canyon lands of Utah.

After circling over colorful rock formations for pictures and a view, we decided to stop at Bryce Canyon Airport, landing on what seemed an inexplicably long runway, suitable for LAX or J.F.K. Gary Black doesn't like to make hotel reservations. He enjoys the spontaneity of landing where he wants and seeing what's there. We taxied to a hangar that looked like a barn. Local pilots came out of the building to inspect this new plane.

**T**he Klapmeier brothers were both obsessed by flight from an early age. Alan, the older of the two, says he dreamed of being a military pilot and cried when he got glasses in third grade and had to give up that fantasy. Nonetheless, he took flying lessons in high school. When Alan went to college, he bought a 1947-vintage Cessna airplane, and Dale and his parents also took lessons. "Dale is one of the few people who got to use the family airplane before he used the family car," Alan says.

Alan, now 41, has a stocky build and squarish face and a tendency to make wisecracks. Dale, 38, is taller, with a longer face and more sober air. By the time both were out of college, the brothers decided to start their own business building "kitplanes." Kitplane makers sell components of airplanes to hobbyists who then spend hundreds or thousands of hours welding and bolting them together. The brothers set up shop in a barn behind their parents' house, which was then near Baraboo, Wis. They searched scrap yards for spare parts, borrowing money from their parents.

Their first plane was a futuristic-looking cigar-shaped craft with one huge propeller in the back of the plane. It was made of fiberglass, which allowed a more aerodynamic shape, making the plane faster than standard metal planes. The brothers trekked from air show to air show, confident that when people got a look at this VK-30 quasi-rocketship, they would rush to buy the kits. Almost no one did.

"We were looking for people with a couple hundred thousand dollars to spend and the skill and time to put years of work into it," Dale Klapmeier now says. "Those people are not out there." The brothers stayed in business by designing a similar version of the plane for a company in Israel. And they started over, determined this time to tie their vision to market demands.

Perhaps the biggest problem facing the brothers' aspiring airplane company was the dwindling supply of customers. During World War II, vast numbers of Americans received flight training, and as that generation matured and prospered, the total number of active pilots rose to a peak of 827,000 by 1980. Then it began falling steadily, to a low of 616,000 in 1997. The only thing falling faster was the production of new planes. In 1978, Cessna, Piper and other companies sold a total of nearly 18,000 new aircraft. By 1994, their annual production was below 1,000. Although it has nearly doubled since then, the 192,000 planes in the general-aviation fleet are on average very old, since so few new ones have been built in the last 20 years.

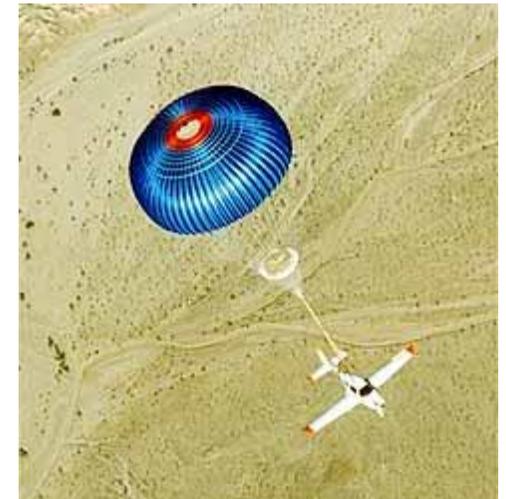
The big aircraft companies insisted that liability-insurance premiums were the main cause of the production drop. And in the mid-1990's, Congress, backed by the aviation industry, pushed through the General Aviation Revitalization Act, which put an 18-year limit on manufacturers' liability for accident claims involving their airplanes. Since Cessna and Piper had sold virtually no small planes in the preceding 18 years, this greatly reduced their liability.

But the Klapmeiers reasoned that insurance was only part of the problem. "They weren't giving people a reason to buy," Alan says. Year after year, the manufacturers offered the same planes -- the Cessna 172, the Piper Archer, the Beech Bonanza -- each essentially the same as the year before, only more expensive.

"It was simply a value question," Alan says. "Somewhere in the late 1970's, you got to a situation where you could buy a new airplane for X dollars, or you could buy a 2-year-old version, with 200 flying hours, for one-half X. The lack of product improvement simply added up to bad value." The problem, he says, was like Detroit's in the 1970's -- without any invigorating challenge from the Japanese.



Seeking safer skies: Scott Anderson, center, was killed while piloting an SR20 prototype during a test flight in March.



The finished product features a parachute in case of mechanical failure.

The Klapmeiers decided to become the Japanese. Three great obstacles, they argued, were keeping an increasingly prosperous public from buying planes -- cost, comfort and safety. And the perception that flying was unreasonably dangerous was keeping people out of the sky.

**T**he next morning, at Bryce Canyon, it was my turn to sit in the left seat. As I taxied, I suddenly understood the runway's enormous scale. The elevation of Bryce Canyon's airport is nearly 7,600 feet, one of the highest in the United States. At that altitude the air is so thin that the plane had to struggle to find enough air to support it. We rolled down the runway, using 1,000 feet of distance, 2,000, 3,000, enough that the plane would have been aloft anywhere else. Finally it was going fast enough to build sufficient air pressure for lift. It edged up, and we headed toward the surrounding peaks.

For the next three hours, thin air and mighty peaks were the theme. Finally, as turbulence picked up from a storm moving through the northern Rockies, we went to 15,500 feet -- an altitude at which we were required to breathe oxygen. Objectively we were fine -- 4,000 feet over the nearest mountains, in a strong new plane just purring along, but the nonobjective part of my brain began to worry. The peaks below were menacing; in my mind, I started ticking off the safety features of the plane.

Over the last 50 years, small airplanes, like big ones, have become far more reliable mechanically. Year by year, the number of deaths in general aviation has declined. In 1998, there were 361 crashes, killing 621 people. The fatal-accident rate per hours flown was the lowest ever, 1.35 per 100,000 hours. So far in 1999 there have been fewer deaths, with more hours flown. Mechanical failures account for about 10 percent of all fatalities. The great majority of people who die in small planes die the way John Kennedy apparently did: by suddenly getting into "instrument meteorological conditions" -- flying inside a cloud, in haze, over water or unlighted terrain at night or in some other way that prevents a pilot from seeing the horizon -- in which a mechanically sound plane can no longer be controlled. For reasons that sound unconvincing until you try it yourself, it's impossible to keep an airplane level when you can't see the horizon -- unless you have been trained to comprehend the artificial-horizon and other instruments in the plane.

There's an assumption in aviation that if you don't like these potential hazards, you should stick to cars. But the Klapmeiers disagree. "No matter how good a pilot is, he's inevitably going to make mistakes," Alan says. "The cost of the mistakes shouldn't be death." The question for the Klapmeiers, as they tried to design a new plane, was how to make one that reduced both the opportunities for human error and the fatalities when errors unavoidably occur.

One way was to reduce the "pilot workload" -- all those switches to flip and gauges to check -- involved in flying a plane. Therefore the Cirrus was designed with fixed rather than retractable wheels (to avoid the "My God, did I lower the gear?" panic just before landing) and a variety of other simplified controls. The cuffs on the Cirrus's wings, the first Federal Aviation Administration-approved application of this concept, which was developed at NASA, allow the pilot to worry less about putting the plane into a stall or spin. And the large, vivid "moving map" in the center of the control panel enables pilots to take in their position in a single glance instead of through a variety of laborious calculations.

Accidents that do happen are also potentially less damaging, thanks to changes in the airplane's structure. The Cirrus has different, better seat belts, seats engineered to let the occupant survive as much as a 26G vertical drop and a fiberglass construction that affords crumple space to absorb shock, like modern car bumpers. And it has a parachute -- for the entire plane.

**T**he parachute is the most radical and weirdly controversial feature of the Cirrus. Old-school pilots grumble that they'd rather have the extra 83 pounds (for the chute and supporting structure) for their own payload. But in his early days in flying, Alan Klapmeier was involved in a midair collision -- another small

plane, taking off into the sun, hit his and knocked off a portion of the plane's wing- and he thought it was a miracle that his instructor steered the crippled craft to the runway for landing. "The effectiveness of the parachute had been demonstrated with experimental airplanes," says Paul Johnston, Cirrus's chief engineer. "But it was really Alan promoting the idea to us, because of his experience."

After some 40 test drops with parachutes -- first attached to big barrels of sand and eventually to real airplanes -- Cirrus developed a reliable parachute that should lower the plane to a survivable landing when all other options are exhausted. The plane would be severely damaged, but occupants should survive. "Veteran pilots will come up and tell me, 'Well, I'd never pull that thing,'" says Johnston. "But most people say, 'What a great idea.' To the uninitiated, it's a way to take the terror out of flying." As Alan puts it, "Even if no one uses the chute, there is a value in peace of mind."

Private planes, even ones with parachutes, may not be for everyone, any more than fancy R.V.'s are. But there is more in common between planes and luxury R.V.'s, Alan Klapmeier claims, than most people assume. An airplane lasts at least three times as long as a car, he says; it can be financed over at least three times as long a period; it retains considerable resale value when it is 20 or 30 years old, as cars do not. Therefore, by his calculation, the capital cost of owning and maintaining a Cirrus is roughly that of a \$60,000 car.

Nevertheless, that's expensive. "But in 1997," he points out, "there were 965,000 automobiles sold in North America that exceeded \$40,000 in cost. A great number of those people could have afforded to buy airplanes. So the reason people don't buy airplanes is not cost; it's that we haven't shown that they're practical."

The United States government seems to agree that personal aircraft, made fast, comfortable and safe, could be a practical alternative to our currently overloaded transportation systems. In a recent speech, Daniel Goldin, NASA's administrator, claimed that the impending saturation of the hub-and-spoke air network had already made airlines inefficient for all but the longest trips. On journeys of 300 to 400 miles, for instance, the effective "doorstep to destination" speed for airline trips, he says, now averages a mere 50 to 60 miles an hour. Using small airports can often increase this speed, because in cities, they are generally closer to business districts, and there are more of them in rural locations as well. Small planes are far more subject to weather delays than big planes, but weather permitting, they can go when the passenger wants, and can go more directly, avoiding hub-and-spoke connections. It is for such trips, of between 100 and 500 miles -- New York to Buffalo; San Jose to Santa Barbara; a nonhub site like Columbus, Ohio, to another one like Rochester -- that even slow small planes can be better than any alternative. Or at least better for some people: it is hard to imagine great throngs being prepared to take up flying just to avoid long lines at the check-in counter.

**A**fter lunch at Scott's Bluff, Neb., we took off again and came up on a large cloud system. Passing through little wisps of cloud on a clear day is exhilarating, because the swirling mists give you a sense of how fast you actually move. But entering a full cloud bank changes all the perceptions. The air is suddenly rougher. The windows seem covered by cotton. Your attention switches exclusively to the instrument panel. We activated an instrument flight plan, and I tried to keep the plane on course.

The Cirrus was designed for instrument flight, but it was not designed to handle ice. Even a quarter-inch layer of ice on the wings can affect a plane's ability to fly -- a reminder that weather is a fundamental source of risk in flying. Inside the cloud, the air temperature fell below zero Celsius, and Gary Black kept checking the wings for the first sign of rime. When he saw it, I called the controller, below us as we passed over South Dakota, to request a descent to air warm enough to melt the ice. The controller handled the transaction with brisk, formula-phrase efficiency. Then he asked if this was really a Cirrus SR20. When assured that it

was, he suddenly shifted out of controller-speak to human discourse. "I have wanted so much to see that plane," he said, "Maybe some day I can get to fly one. Come on back!"

Sixty minutes later, 1,700 miles and 10 hours of flying time after we left El Monte, we landed in the twilight near Lake Superior.

**C**irrus must now convince people that flying its planes is a safe, viable alternative to other means of transportation -- no small challenge. More immediately, the company must gear up production. The factory in Duluth is a spare, white-painted, modern-looking structure, with vastly more floor space than is needed for current production levels. The Klapmeiers established the factory here in 1994 in large part because there was a huge airstrip available from a decommissioned Air Force base, and because the city was willing to offer some \$2 million in investment and incentives. Since the summer of 1994, when the first mock-up of an SR20 was unveiled at an air show, Dale Klapmeier has been Mr. Inside, keeping the design, testing and production moving, and Alan has been Mr. Outside, endlessly working the hustings to raise the \$70 million the company has spent on testing, development and production facilities.

The company has bounced from one financing emergency to another, the latest and potentially most threatening occurring after Scott Anderson, the test pilot, was killed. Although he had flown the test planes for Cirrus's parachute-drop tests, routine flight tests were conducted without a parachute.

Cirrus and the National Transportation Safety Board quickly located the problem. In certain maneuvers that put high stress on the wing -- and that would probably not occur except in deliberate tests -- the aileron (which makes the plane bank left or right) could become jammed against the wing. Cirrus redesigned the aileron and ran countless tests. Gary Black took the plane up for its first postcrash flight. At the time of the accident, the company had 249 "contract holders" for the SR20 -- people who had put down a \$15,000 nonrefundable deposit for the right to buy a plane when it came off the line. Four months later, when the first plane was delivered, the list numbered 333. In early November it reached 400. People on the list operate their own Web site, where the few who have taken delivery tantalize the others with accounts of the trips they take.

The brand-new plane in which I flew was the ninth SR20 built. The company is hoping to produce a plane every four days by the end of this year, and a plane every working day by next fall. That would move them through the current customer backlog in about two years.

When Tom Bergeron, the Cirrus salesman, dropped us off at El Monte, he asked me, "So, have you put down your deposit yet?" I laughed him off. "Come on, I'm still paying college bills!" I protested. But as I turned for a last look at the plane while driving away from Duluth, I thought: If I put down a deposit now, I wouldn't really have to start paying for at least two years. And my kids will be finishing college then.