THE MISSING LINK IN AVIATION

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WRITTEN SO YOU CAN UNDERSTAND IT

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The MISSING LINK

The author and his Kellett autogiro. Top, scene on roof of Chicago post office just after Miller had landed autogiro there

By John H. Miller

Chief Test Pilot, Kellett Autogiro Corp.

IN 1934, I thought I was buying my last automobile. The old bus now is much the worse for wear but I still hope my next car will be a roadable autogiro.

With it lies the future of transportation for the motorist who wants to fly and the flier who must motor when his trip is short or the weather is bad. It puts three whirling wings on the automobile and forges new measures of protection and convenience for the aviator. Get this picture:

From my suburban home, I duck out to my one-car garage, where the giro waits, its three rotor blades folded back over its tail. Slipping the road gear into reverse, I back out and drive off in the city-bound stream of traffic. A half mile and I come to an open lot, turn in over the curb and stop to break out the rotor blades. It's simpler than putting up the one-man top on a convertible roadster.

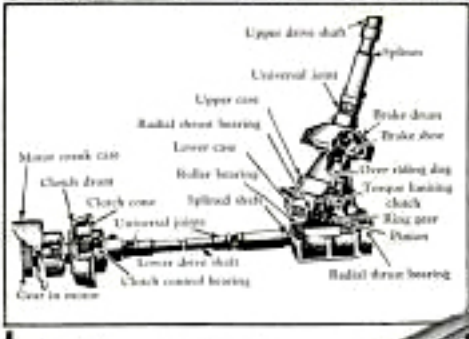
I rev up the rotor system, having switched over from the traffic gears to the flying gear, and a moment later I am flying at 100 miles an hour, high above the crawling stream of traffic. I can go faster or slower but I know that in less than ten minutes I shall be dropping into a city parking lot beside my office, twelve miles distant. I can land, fold back the blades and become a motorist if upstairs weather gets bad. I can use the city streets if I have errands there. Family week-end trips can be projected hundreds of miles beyond auto range. I have an automobile and an airplane, all in one.

This is no dream. Such a machine has been built, driven and flown. You can or-

in AVIATION

der one today if you are willing to pay the price. But the price as yet is high and the engineers have not completed the studies which will make the roadable autogiro the nearly perfect transportation machine it is sure to be some day. As yet, it cannot carry the load or afford the comfort I have been taught to expect in my car. The price will not come down appreciably until hundreds of models can be sold. And so, I still am

Artist's conception of landing platform atop city building as visualized by Miller to speed up handling of mail. Below, Miller delivering bags of mail to Chicago postmaster after landing his autogiro on roof of the post office



Top photo © Underwood and Underwood

Autogiro, top, landing on capitol plaza, Washington, D. C. Center, details of rotor starter of Kellett autogiro. Bottom, autogiro with rotors locked back, showing small space occupied by machine

descending flight, each blade becomes identical with a glider flying downward in a spiral. Together, the three follow each other in a tight spiral or helix. If three gliders were to execute this maneuver, they would bank more and more steeply as the spiral became tighter. But if the three gliders are joined at a hub, much of this bank is eliminated by the balancing of their opposing forces.

That is exactly what happens in the flight of an autogiro. The gliders or blades are joined on a ball-bearing hub so they neutralize to a degree and provide lifting energy. In forward flight under power, the gliders still have a tendency to spiral downward but this is checked by the forward propeller which pulls the ship and rotor horizontally. Likewise, as the advancing blade rises, the retreating blades drop, so that though the same spiral exists, the glider skids around its forward turn and slips as it crosses the tail of the ship.

The weight of the giro or propeller thrust provides the only energy to revolve the rotor once the ship is in the air. The motor has nothing to do with it and neither has the slip stream. Most of the maneuvering is done by tilting the rotor hub so the direction of the blades points the nose of the ship upward, downward or in a lateral direction. The ship follows its nose. We have effective control at any speed that will keep the ship off the ground for we do not need a rush of air over any control surface to operate. The rotor turns automatically when the ship is flying and as long as it turns the ship can be piloted normally.

An autogiro can land in a tennis court, and can take off in the length of a football

waiting for the production fellows to turn out a giro which will compete favorably with my 1934 car.

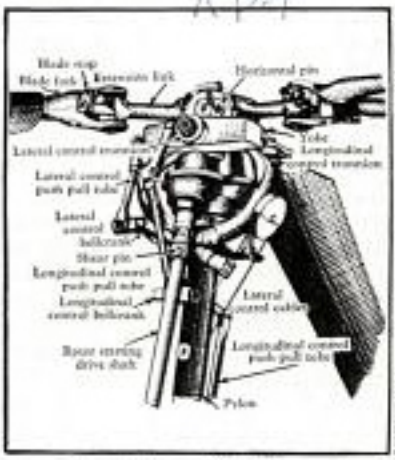
The autogiro is an aircraft without wings. It is supported in flight by its whirling vanes, a set of overhead blades which operate like three individual gliders. In

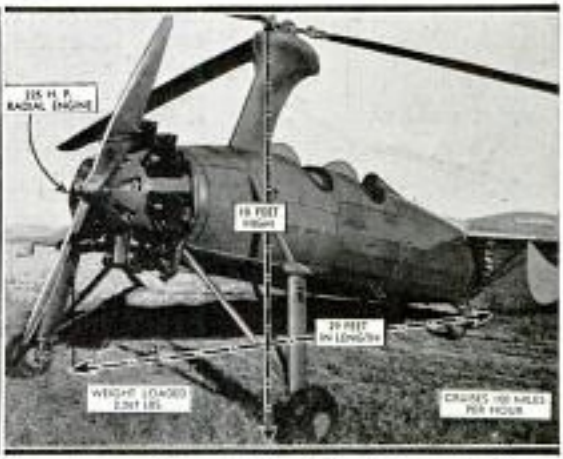
field, no matter how bad conditions are. It can fly at zero or 125 miles per hour. It can climb 1,200 feet per minute and go well above 15,000 feet. It performs as well at thirty to fifty miles per hour as at 100 and, in a wind of twenty miles per hour, it can stop, hover, and gently move off sidewise, if that is desired.

American-built giros need a stiff breeze to leap into the air with a forward run of only ten or fifteen feet but the British makers have built—though perhaps not wholly perfected—the direct jump-off giro which goes into the air from scratch, pulling itself from the ground by its rotor energy. The Pitcairn Autogiro company hopes to have such a ship, possessing roadable characteristics, on demonstration here later this year.

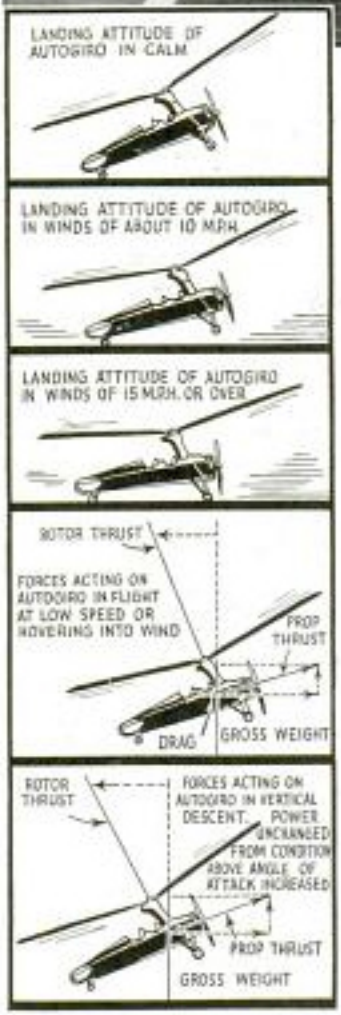
The autogiro differs from its cousin, the helicopter, as much as it does from the airplane. The helicopter has no propeller but actually flies itself through the forward pull of its rotor system. That means the power at all times passes directly into the rotor, turning it mechanically. In the autogiro, the rotor blades turn automatically.

Today, there are about thirty-six privately owned and licensed autogiros in the United States. In addition, there are seven





Top, loading mail at Chicago airport, preparatory to trip to roof of post office. Below, view of Kellett autogiro, showing dimensions, and detail of rotor head



Autogiro landing on Italian cruiser. Left, landing attitude of autogiro under various conditions, and forces acting on craft in flight and in vertical descent

Kellett giros being flown by the army. The seven army giros and one of the private, licensed ships, are of the wingless, direct-control type. These differ from the obsolete kind in that the wings have been eliminated to give control independent of the airplane limitations which the short, stubby wings introduced. The last of the winged type was built in 1932. Many of them, however, are doing good jobs, crop-dusting, scouting for plant and tree pests, serving as sport planes and for banner-towing and short-hop taxi assignments.

The giros produced during the next year will enlist in the army for observation, communication, mapping and similar uses where their slow flight and freedom to land and take off become invaluable.

Inauguration of feeder mail services by autogiro may begin within a few months, for recent experimental flights have proved them practical. Congress has passed a law deputizing the postmaster general to begin such tests. The giros will be used to bring the mail from outlying towns to airports on the main air-mail routes or to fly the mail to and from central city post offices and distant airdromes.

I have been flying autogiros for seven years. During this period I also operated conventional planes, so I know what each type of aircraft can do and where each out-performs the other. Six years ago I was looping the old wing-type giros at air meets. I flew the first autogiro from coast to coast and I owned a giro and used it to make my living for several years. Therefore, I know the shortcomings of those early cranky, unpredictable ships.

But those old "babies" could fly like no other aircraft before them. One time, I was towing a banner in northern New Jersey when my engine cut out. Below me was a woods bristling with trees, and a cemetery full of tombstones. I chose the graveyard and squeezed that little crate into a space about 100 feet square. The giro's prop nestled against a mausoleum, its tail gently rubbed a granite cross. That's as near as I want to come to a cemetery while flying. And it's a certainty I would have landed there for keeps if I had been flying anything but a giro.

When the wings were dropped, the engineers gave us

a machine which will come down slower than a parachute, even with all power cut off. With one of the new ships, I might have made a safe landing on top of the mausoleum.

Learning to fly such a giro is no more difficult, and may be easier, than learning to fly an airplane. It is a different proposition entirely. Being a good airplane pilot may help or hinder a new man's giro skill—but airplane experience is quite unnecessary. There is this to say for the giro: If you get in trouble you can slow down or let the ship land itself. You will probably walk away unscratched even if your ship "dents a fender."

In 1935, two direct-control autogiros were landed on the roof of the Philadelphia post office. This year, I did the same thing with a Kellett giro, sitting it down on the roof of the Chicago post office with an air-mail shipment from the Chicago airport. The trip beat truck time by forty minutes. A few days later, the KD-1 giro and

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The Missing Link in Aviation

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I made four landings in the populous Washington, D. C., area—all without benefit of landing fields, in the usual sense of the term.

We used a muddy golf driving range first, picked up the mail there and flew in to the main post office. There we landed in a half-pint, tree-rimmed park. The same day, I twice landed in "E" street, directly between the Department of Commerce building and the Willard hotel. Mail

German helicopter, above, propelled by engine-driven rotors. Below, autogiro equipped with floats

was put aboard and I flew it back to the Washington airport. No right-minded person would dream of making any of these landings in an airplane.

Such demonstrations point the future for the autogiro. They explain why the chiefs of army artillery, infantry, cavalry and coast artillery; spokesmen for the coast guard, national guard, forestry service, Department of Agriculture, the navy, and private flying interests all went on record before a congressional committee recently in favor of immediate development that will take the autogiro out of the experimental stage and put it to work where it can save time, money and lives.

A single hangarful of autogiros do these amazing things now—all that the future

needs is the investment of money and brains to produce them by the scores and put into them performance for the tasks where more performance is required. Uncle Sam has spent $500,000,000 in the last five years on airplanes while the autogiro has received just $485,000 in that time. That is why we are in a stage corresponding roughly to the state of the automobile in 1916. Today, for example, a good giro, custom-built, would cost about $25,000. My company figures it could sell a better ship for the price of an automobile if it could find a market for 1,000 a year.

Giros land easily and safely in small areas, take off in slightly larger areas and can fly slowly. They belong in the hands of men who want to do these things. Airplanes fly faster, more powerfully and further. Their work already is cut out for them while giros fill another field.

The next decade will find the autogiro putting wings on the family car, the mail truck and the bus which hauls passengers from town to the big airport. It will see six or eight-passenger giros feeding to the main air transport lines from cities off the trunk systems or too small to support a large landing field. It will see giros working with the army as transports for officers, patrols for moving columns of troops and eyes for the artillery. Observers and patrols in the forestry, plant-quarantine and coast-guard services will go aloft in them to better their efficiency. Clouds of death-dealing spray will pour out from them on pest-threatened fields.

I have a hunch the first nine years are the hardest. Watch our exhaust gas about the time the American autogiro celebrates its tenth birthday. That's still many months away.

Thirteen-Story Welded Hospital Is Built without Noise

Built without the machine-gun rattle of rivet hammers, the thirteen-story Woman's Hospital of Pittsburgh is that city's first arc-welded skyscraper. In its construction, 2,300 pounds of welding rods took the place of 30,000 pounds of rivets that would have been used in conventional methods. The inherent strength of the welded joints made it possible to eliminate plates and connecting angles equaling the steel required for an additional floor.

Sky Ladder of "Windmills" Lines Up at Autogiro School

Six wingless autogiros flying in echelon formation with student pilots o the controls are caught by photographer over Wright Field at Dayton

In these days of mass airplane flights and sky parades in formation, a formation flight of autogiros is still relatively rare. A photographer climbed high over Wright Field at Dayton, O., the other day to "shoot" a sky ladder of "windmills." Members of a class of student pilots were putting their wingless autogiros through drill in echelon formation.

Wingless Autogiro Parks Like an Automobile

Wingless Autogiro Which Rises and Lands Almost Vertically and Can Be Parked Like a Car

Requiring no more room to park than an automobile, a wingless autogiro was demonstrated recently in Washington. It rises and lands vertically and is capable of hovering virtually at a standstill in the air. The rotor blades can be folded for parking and the machine then can be stored in a garage without trouble. It lands and takes off within twenty-five feet and hence nothing more than a small open space is needed as a landing field.