

# Journal of Air Law and Commerce

---

Volume 7 | Issue 4

Article 15

---

1936

## Probable Aircraft Trends in the Near Future

John H. Geisse

Follow this and additional works at: <https://scholar.smu.edu/jalc>

---

### Recommended Citation

John H. Geisse, *Probable Aircraft Trends in the Near Future*, 7 J. AIR L. & COM. 521 (1936)  
<https://scholar.smu.edu/jalc/vol7/iss4/15>

This Symposium is brought to you for free and open access by the Law Journals at SMU Scholar. It has been accepted for inclusion in Journal of Air Law and Commerce by an authorized administrator of SMU Scholar. For more information, please visit <http://digitalrepository.smu.edu>.

## PROBABLE AIRCRAFT TRENDS IN THE NEAR FUTURE

JOHN H. GEISSE\*

Approximately two years ago I had the honor and pleasure of addressing your regional meeting at Des Moines. At that time I stated that it was my firm conviction that airplanes for private use would have to be made easier to fly, safer and more comfortable and that these features should take priority over attainment of high speeds. I also advised you that the Bureau had prepared a specification outlining the characteristics it believed should be incorporated in private airplanes and that we had contracted for the construction of airplanes to this specification. I advised you that the airplane would be unconventional in appearance and appealed to you to not let your prejudices against its appearance stand in the way of giving this airplane a chance to prove that it had a place in private flying.

At that time I was entirely convinced that this airplane would not appeal either in performance or appearance to the licensed pilot as to him it would only be an aerial baby carriage. I have the very pleasant task now of advising you that this conviction was wrong. The first of these airplanes was delivered to the Bureau early this year and it has been flown almost continuously since that time, demonstrating to both pilots and prospective pilots; and, contrary to my expectations, the pilots as well as the non-pilots have been almost unanimous in their commendation. The plane has been flown by many people who have never flown an airplane before and a large number of them were permitted to take the airplane off, fly it and land it on their first trip.

In its ease of control this airplane exceeded our expectations in that it was found perfectly practicable to disconnect the rudder controls and lock the rudder in the neutral position. This change was made shortly after the airplane was received and all of the flying that has been done since has been done without rudder control. This flying has included taking off and landing 90 degrees across the wind in winds as high as 25 m.p.h. Before the rudder was locked it was impossible to put the airplane into a spin under full load conditions but it was possible to get about a turn and a

---

\* Chief, Aeronautics Development Section, Bureau of Air Commerce.

half of a spin under light load conditions with controls fully reversed following a whip stall. With the rudder locked it is impossible to put the airplane into a spin under any load condition. The lateral control in the stall is comparatively good but not all that we would like to have. There is under some stall conditions a tendency for one wing to drop. However, with the stick held full back this wing can be brought up again with only a relatively slight loss in altitude. Although there is no tendency to whip off sharply, the mere fact that a wing may go down against the wishes of a pilot makes it fall short of the ideal.

The airplane can be landed in any attitude and the brakes immediately applied and it has been landed over a 35 foot obstacle and brought to a stop within 350 feet of the base of that obstacle with no wind. In tests of the effectiveness of the brakes, the airplane was paced by an automobile up to 45 m.p.h. and stopped from that speed in 138 feet, which was just about the best the automobile could do.

The plane is equipped with trailing edge flaps which are unusually effective as a glide path control. They may be quickly taken off or put on by means of a lever extending up from the floor board. When the flaps are all the way down the plane almost points at the spot on which it is going to alight and the angle of descent is exceptionally steep. It has not actually been measured but in flying the airplane it gives the impression of being almost 45 degrees with an airspeed of only 70 m.p.h. The effectiveness and quick control of the flaps together with the fact that no change in trim is required when they are used has led to a technique in their use differing from that ordinarily employed. This technique consists essentially of gliding the airplane to the field without flaps intentionally high enough to slightly overshoot the field if the flaps are not used. The flaps are then put into use to steepen the glide the necessary amount in order to land at the desired spot.

These remarks about the performance of one airplane may appear not altogether in keeping with the subject matter given to me for this address—"Probable Aircraft Trends in the Near Future." I have taken the time to describe the performance of this airplane to you because it has many of the characteristics which I feel will be incorporated in many of the airplanes of the future. Briefly, features in this airplane which I believe should be striven for in all airplanes for private owners are perfect visibility, complete elimination of the spin, stability in the stall, controllable glide path, braking power equal to that of the automobile and usable at any

time, the ability to land thruout a wide range of attitudes and speeds, and two-control operation.

This airplane does not meet two other requirements that I consider essential—first, a minimum flying speed of not over 35 m.p.h., preferably less; second, the ability to climb out of a very small field.

The original specifications for the Hammond Airplane called for a minimum speed of 35 m.p.h., but the opposition to such a low minimum speed was so great that we permitted this to be increased to 40 m.p.h. Now, after a great deal of experience with the Hammond, I regret the change in the specifications. My reason for this regret is not a desire for a lower landing speed but more correctly a desire for a lower crash speed. Reducing the landing speed does not make the landing appreciably easier and in some cases may make it more difficult. In the Hammond particularly, altho it can be landed at slightly over 40 m.p.h., normal landings are closer to 55 m.p.h.; and, in tests conducted by the National Advisory Committee for Aeronautics on the Weick Airplane, attention was called to the fact that the difficulty of landing is more nearly proportionate to the vertical speed of the airplane than it is to the airplane's landing speed. This is because the vertical speed determines the rate at which the ground is approaching and the rate at which controls must be maneuvered. There is, however, one irrefutable fact and that is that if a crash is inevitable in a forced landing the crash will be much less serious at a low speed than at a high speed. In fact, it is probably quite possible to so design an airplane that it can be crashed at 35 m.p.h. with excellent chances of the personnel escaping serious injury. Perhaps it may seem to you that providing for the very occasional crash would not warrant the considerable decrease in performance which must be expected with any decrease in landing speed. However, a fact that we are apt to overlook is that we unconsciously regulate the altitude at which we fly by the hazards associated with a forced landing, and I am sure you will agree that the pleasure of flying is inversely proportionate to the altitude of the flight. Not only does the change in scenery from high altitudes become so slow that it is monotonous; but flying at high altitudes deprives one of the pleasure which we associate with traveling at high speeds, as even the fastest airplane then appears to be crawling. One of the greatest arguments that can be put forth in favor of seaplane flying over landplane flying is the fact that the seaplane may be operated at a lower altitude where we can observe in detail the country over which we are fly-

ing. Some of this pleasure can be transferred to the airplane by reducing to a minimum the hazards of forced landings and this entails a lower crash speed.

If the airplane is not developed to a point where it is safe even in a forced landing crash, then we may expect to see the private airplane of the future equipped with an airplane parachute—that is, a parachute which will bring down the airplane as well as the passengers. This has already been done experimentally; and, if the status of our development funds permit, I expect that the Bureau will take a part in the further development of this safety appliance. I do not expect this development to be incorporated in transport airplanes.

The requirement of being able to operate from small fields I list as separate from the requirement for low minimum flying speeds because the reasons for the requirements are different. In my address to you in Des Moines I stated "I sincerely hope that if such legislation (referring to a Federal Airport Act) is enacted you will use your influence to see that many simple airports conveniently located rather than a few super air terminals are the immediate result." What I expected to happen has happened and one terminal airport has now been practically closed to private flying since no operations are permitted from that airport without radio facilities in the airplane. This is the start and I do not believe it would be far wrong to hazard the guess that in another three years all major airports will be closed to private flying. When these airports are closed private flying is going to have to transfer its activities to the smaller airports presently available and as it expands, if the additional airports required are not to be at inconveniently great distances from the centers of the cities, they will be still smaller. The future private airplane *must be built to operate from smaller and smaller fields in direct contrast to the trend of the past few years towards the requirement of ever larger fields.* Private flying will not be able to support, on its own, flying fields of the size of our present terminal airports.

The subject of flight strips, i.e., landing strips adjacent to highways as highway intersections as a part of our highway system, was mentioned in your meeting yesterday. Such strips in combination with roadable airplanes offer an excellent solution of the problem of airports for the private flyer. I feel confident that we may expect to see the development of such roadable airplanes. You may recall that Mr. Ray, of the Autogiro Company of America, was able to return to Philadelphia from the races last year by taxi-

ing his plane over the mountains when all others were impatiently champing at the bit in Cleveland waiting for the weather to clear. He accomplished this feat unheralded and in a plane not designed for such use. If he were to be faced with a similar situation today he could make the trip in an autogiro constructed for road operation. This vehicle, being developed for the Bureau of Air Commerce, is about ready for delivery. I have already had the novel experience and pleasure of riding in this down the highway and driving it around the field. The conversion from a flying machine to an automobile takes but a few minutes. The roadable feature on this particular plane added only 15 pounds to its weight.

In any discussion of the airplane of the future or of roadable planes, the tailless plane cannot be overlooked. Mr. Waldo Waterman is now engaged in preparing one for the market. The new version will be roadable and will be powered with a modified automobile engine. It is now operating in its roadable phase on the West Coast and I understand that it is capable of a high speed on the road in excess of 50 miles per hour. Of interest is the fact that in California it is licensed as a motorcycle rather than an automobile since it has three wheels instead of four. As a roadable vehicle it must carry a license and a horn and meet all of the other requirements for a motorcycle. Because of its advantages in respect to cost, storage space, and ease of roadable conversion, the Tailless Airplane will become a serious contender for the private market if it can be made to have flying qualities equal to those attainable with conventional types.

The conventional airplane will also have a serious competitor in the direct control autogiro. The fact that the present direct control autogiro can land and take off from small fields and reduce its forward speed to almost zero for forced landings gives to this vehicle the distinct advantage mentioned previously of safe flight at low altitudes. When there is added to this the jump off feature which will permit operation from any space large enough to hold the plane the tremendous advantage it will have must be acknowledged. Jumps up to 35 feet have been made in England with power plants no larger than those regularly used in planes without the jump off feature. The reverse of this procedure, storing energy in the rotor in vertical descent for use in cushioning the ground contact, appears to be possible but not immediately desirable.

There is one development which has received little attention in this country but which I expect to see incorporated in future airplanes for private flying. This is the shock absorbing wing. We

now build into our airplanes that which we call stability, but it is primarily stability relative to the air. In other words, we try to make the airplane such that it will maintain a constant attitude and motion with respect to the air—not the ground. We then, in some cases, superimpose on these built-in forces, an automatic pilot which does its best to maintain the attitude of the ship with respect to the ground irrespective of the attitude of the ship to the air. Stability relative to the air requires the airplane to respond to the whims of air currents and gives us a roller coaster ride. The automatic pilot tends to keep the keel level but in so doing gives us an elevator effect with a greater amplitude of altitude variation. The passenger would much prefer to ride on an even keel and along a straight path at constant elevation. Some system of shock absorbing wing would go a long way toward providing such a ride and in so doing would decrease the stresses in the airplane structure and permit it to be lightened accordingly.

For fear that no mention of converted automobile engines for the future private plane may be interpreted as indicating that this is a dead issue, I desire to assure you that it is still alive and kicking. Altho the particular applications which we fostered have not come up to our expectations we still have hopes and these hopes were strongly bolstered a short time ago by the appearance in Washington of the Funk two-place cabin plane powered with a modified Ford Model B engine which had excellent performance—perhaps because it was developed without our interference. I am advised that the parts for the engine cost \$150.

The development in transport planes will undoubtedly diverge more and more from the development in private planes. Recent researches into the effects of altitude on pilot and passengers certainly point toward the development of supercharged cabins not only for sub-stratosphere flying but for flying at altitudes now commonly used. Passenger comfort will probably demand this change. It is most interesting to note in this connection that oxygen deprivation effects are the same as the effects of alcohol. The effect of liquor is to deprive the blood of its normal oxygen supply and its effect is cumulative with that of altitude. If you start out with a passenger only half intoxicated he will become completely so if you fly high enough without a supercharged cabin.

Returning to private flying I desire to give credit to the airplane manufacturers for the progress they have made in improving the safety of their airplanes and approaching the goal I have said was desirable. A hasty survey of the fatalities in non-scheduled

flying for the first half of this year reveals that the percentage of fatal accidents due to stalls and spins is less than 50 for airplanes constructed in or since 1934, whereas for airplanes of an earlier vintage stalls and spins caused 74% of the fatalities. Out of a total of 94 fatalities for all models, 61 were attributable to stalling characteristics, 11 to structural failures, including engine stoppage, and 22 to other causes, 10 of which were chargeable to weather. Of all fatalities 33 occurred in airplanes built in 1934 or later and of these 16 were chargeable to stalls. In these figures I have included stalls which occurred during forced landings.

These figures show a very marked advance in the stability of airplanes and my only regret is that they show the need of still further improvement and that airplanes of the later class still take a toll of lives thru stalls and spins. And, lest someone assume that these have been the result of student flying, let me add that 11 of the 16 spin fatalities in the modern airplanes occurred with pilots having 50 hours or more flying time.

In this connection I should like to appeal to you to use your best efforts to modify the all-too-prevalent attitude of aviation people toward the "dumb" pilot. Remarks I have seen on accident reports such as "Ran out of flying speed and brains at the same time" are not conducive to a widening private airplane market. It is unfortunate that not all of us are so gifted as the author of that report but perhaps some of us—like that unfortunate pilot—are potential customers and with suitable equipment perhaps our dumbness would not be fatal. In our studies of accidents let's not be so ready to charge it up to the pilot but let's see if there is some change we might make in the airplane to prevent a recurrence. Charging an accident to a forced landing is also not sufficient if a change in the airplane could have made that forced landing safer.

In closing I should like to appeal also to the manufacturers thru you to give more consideration to the desires of the man he would like to sell but can't and less to the man he can sell. It would be suicide for any political party to concentrate its attention on localities where its success is assured and overlook those localities which might be captured with a little effort. Following this procedure in aviation may not be suicidal but certainly it is not conducive to growth.

Once before I was accused of trying to force the industry back 25 years. It appears now that that effort may have had some justification. Now I suggest that we try to go back again to the days when airplanes were operated out of baseball diamonds.