High Altitude and Distance

By Jerzy Illaszewicz.

MODERN soaring offers many interesting possibilities in high altitude flying. There are several types of lift which occur at altitudes of from 7,000 to 30,000 feet above sea level.

The main types of vertical currents encountered at altitude are:

1. Pure thermic lift which forms and goes through its life span quickly (altitudes not higher than 5,000 to 7,000 feet).

2. Cumulus energy currents including all kinds of cumulus and cumulo-nimbus (altitudes of action from 3,000 to 17,000 feet).

3. All kinds of thermal storms, including cold fronts (altitudes of action from 1,000 to 25,000 feet).

4. Various kinds of air waves. These are most frequently found in mountainous country during periods of high winds. Little at present is known about air waves. However, when they have been encountered the lift has been smooth and has covered a wide area. Altitudes of more than 30,000 feet above sea level have been reached in experimental flights in air waves.

The rate of climb in these various types of lift is quite different. In pure thermic currents, the rate of ascent of the air is between 3 to 7 ft. per sec. (This may be exceeded in certain of our desert soaring sites in the U. S. Ed.)

In clouds of cumulus structure, vertical currents of 10 to 30 ft. per sec. are frequently found. While in storms and storm clouds, currents of 130 ft. per sec. are not uncommon and are usually very turbulent.

In flying distance before a cold front the average vertical lift is usually between 7 to 10 ft. per sec.

Energy air waves are very special and interesting. The average rate of lift is not very great because of the large area covered by the currents. Common speed of air wave currents is 5 to 10 ft. per sec.

High altitude flights require certain special equipment and demands experienced and able piloting. First, the glider must be strong and have good stability characteristics. It must be able to take the loads imposed upon it by the elements. The pilot must be well grounded in the fundamentals of instrument flying and should have much practice in flying turns by instrument in turbulent air. A complete set of instruments is necessary and should consist of:

1. Airspeed with an electrically heated Pitot or Venturi tube.
2. A variometer (rate of climb indicator).
3. Turn and bank indicator.
4. Pitch indicator.
5. A small aircraft compass.
6. Gyrocompass.
7. Small size artificial horizon.
8. Outside temperature indicator.
9. Pilot's oxygen inhalator.
10. Clock or watch.
11. Thermo-barograph.

A radio transmitter and receiver should also be carried for communication with other aircraft in the vicinity to avoid collision while flying blind. Radio will also aid the pilot in navigation on distance flights in which clouds are used. The above list of equipment was installed in special high altitude sailplanes in Europe and the author has flown such gliders.

Some high performance sailplanes in Europe had special water ballast tanks installed to enable the pilot to take off with a heavily loaded glider during the heat of the day. As the flight proceeded and thermals weakened, the sailplane was lightened by releasing the ballast. At the beginning of the flight when lift was good the sailplane had a heavy wing loading and higher cruising speed and was able to make greater distance.

In distance flights speed is all important. The pilot must be careful not to spend too much time spiraling and must push ahead as fast as possible. Thermal action does not last long—at most 8 to 10 hours a day—although there might be exceptions to this in cold front conditions or tropical countries.

Gaining high altitude for use in distance flights is always welcome and pleasant. But care must be taken not to spend time climbing which would be better spent flying to the next area of lift. In distance flights the object is naturally distance, and altitude is secondary.

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