

the pilot understanding the effect and use of the flight controls, properly using the visual outside references, and the utilization of snap-shots from the flight instruments in a continuous loop of information gathering. A pilot must make effective, timely, and proportional corrections for deviations in the airplane's direction and altitude from unintentional slight turns, descents, and climbs to master straight-and-level flight.

Straight-and-level flight is a matter of consciously fixing the relationship of a reference point on the airplane in relation to the natural horizon. [Figure 3-6] The establishment of reference points should be initiated on the ground as the reference points depends on the pilot's seating position, height, and manner of sitting. It is important that the pilot sit in a normal manner with the seat position adjusted, which allows for the pilot to see adequately over the instrument panel while being able to fully depress the rudder pedals to their maximum forward position without straining or reaching.

With beginner pilots, a flight instructor will likely use a dry erase marker or removable tape to make reference lines on the windshield or cowlings to help the beginner pilot establish visual reference points. Vertical reference lines are best established on the ground, such as when the airplane is placed on a marked centerline, with the beginner pilot seated in proper position. Horizontal reference lines are best established with the airplane in flight, such as during slow flight and cruise

configurations. The horizon reference point is always being the same, no matter what altitude, since the point is always on the horizon, although the distance to the horizon will be further as altitude increases. There are multiple horizontal reference lines due to the pitch attitude requirements of the maneuver; however, these teaching aids are generally needed for only a short period of time until the beginning pilot understands where and when to look during the various maneuvers.

Straight Flight

Maintaining a constant direction or heading is accomplished by visually checking the lateral level relationship of the airplane's wingtips to the natural horizon. Depending on whether the airplane is a high wing or low wing, both wingtips should be level and equally above or below the natural horizon. Any necessary bank corrections are made with the pilot's coordinated use of ailerons and rudder. [Figure 3-7] The pilot should understand that anytime the wings are banked, the airplane turns. The objective of straight flight is to detect small deviations as soon as they occur, thereby necessitating only minor flight control corrections. The bank attitude information can also be obtained from a quick scan of the attitude indicator (which shows the position of the airplane's wings relative to the horizon) and the heading indicator (which indicates whether flight control pressure is necessary to change the bank attitude to return to straight flight).

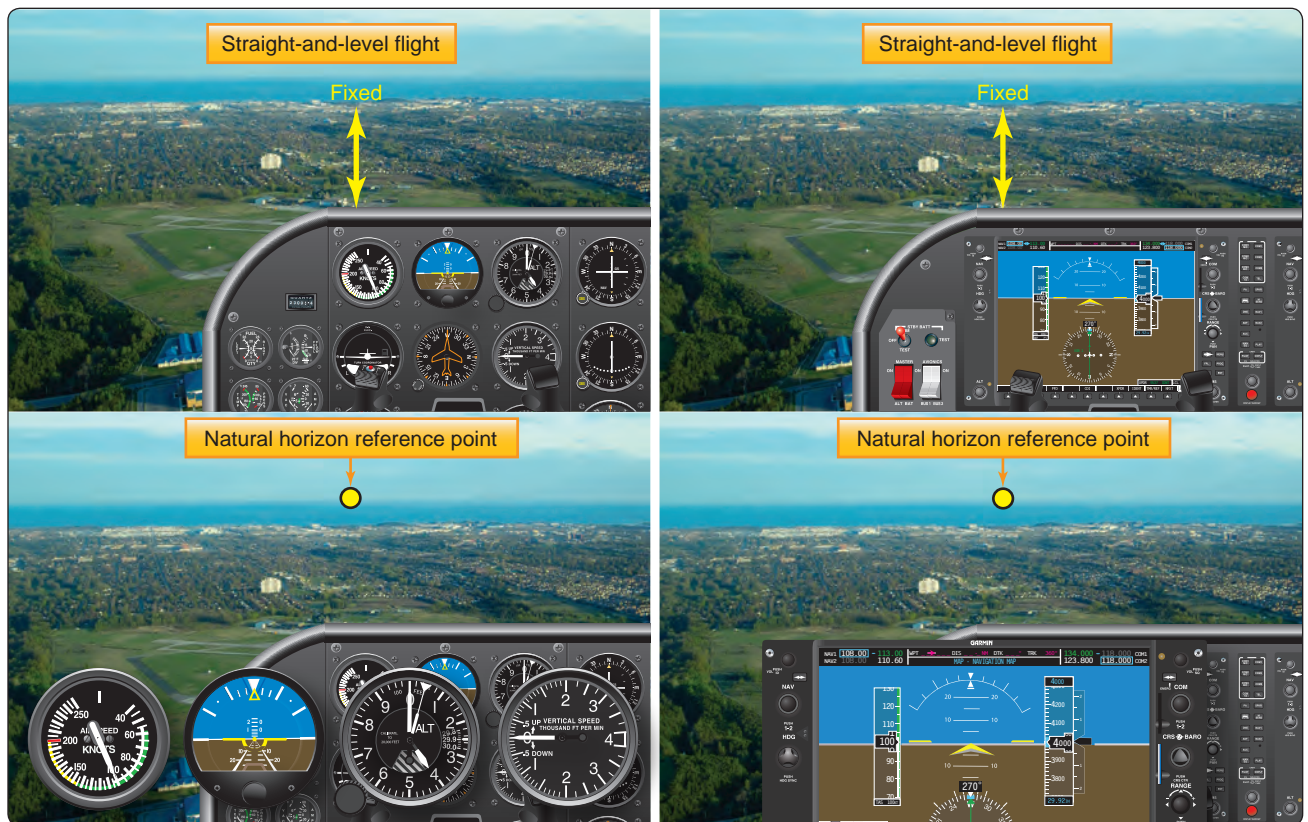


Figure 3-6. Nose reference for straight-and-level flight.