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# Flight-Sim Maneuvers

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## Chapter 1

# Starting Your Flights

Every real-world flight begins with a cold aircraft and a pilot's desire or need to fly. Pilots proceed through a series of steps before they are ready to fly. They don't throttle up and take off like many flight simmers want to do. To simulate flight realistically, follow the startup procedures such as those that real-world pilots follow.

### Startup Step 1 Know Your Aircraft

Every pilot should know the aircraft's performance characteristics, abilities, limits, and requirements before embarking on any flight. These qualities are laid out in the aircraft Pilot's Operating Handbook (POH), which is an operations manual published by the aircraft's manufacturer for the given aircraft. The POH is like the operating manual supplied with every new automobile.

Important performance information for planning any flight in any aircraft include range, cruising altitude, fuel-consumption rates, and

## Chapter 2

# Moving Around Airports

**Clearance to Take Off.** Before taxiing onto a runway at any controlled airport, pilots must have specific clearance to take off. Pilots never taxi onto controlled runways before requesting and receiving take-off clearance. Thus, clearance to take off is also clearance to taxi onto a runway. These clearances specifically identify the aircraft: “Mooney Bravo OMS, cleared to take off.” The pilot then acknowledges that take-off clearance: “Cleared to take off, Mooney Bravo OMS.”

Pilots should be ready to take off when requesting take-off clearance, then they must take off immediately upon receiving that clearance. Pilots should never dawdle in the holding area or taxi onto the runway and dawdle there after receiving take-off clearance.

**Instruction to Clear a Runway.** Once an aircraft has successfully landed and is rolling down the runway, airport controllers instruct pilots to exit the runway at “the nearest taxiway.” This instruction does not literally mean the very next available taxiway, however. It means the next taxiway leading to the destination such as the terminal or parking area that the aircraft can turn onto without tipping over or sliding onto the shoulder and lawn. Thus, the pilot turns onto the next appropriate taxiway after slowing to a controllable turning speed, which is usually 35 miles per hour or slower depending on the aircraft.

## Chapter 3

# Taking Off

### Take-off Pitches

*Take-off pitch* is the nose/tail attitude of your aircraft as it leaves the ground and for the first few hundred feet or meters above the ground. The ideal take-off pitch enables your aircraft to lift smoothly without jostling everything in the cockpit, including occupants, charts, briefcases and other items. It also requires only minimum pitch adjustments shortly after the aircraft lifts off to attain the speed for the best rate of climb.

The appropriate take-off pitch differs for various aircraft and under various conditions. They range from about 10 degrees to 30 degrees for most aircraft. Lower pitches are common for heavy turboprop aircraft such as commuter and military planes. Higher pitches are common for fast jets such as airliners and fighters. In lieu of specific data, use the following pitch guide: about 10 degrees for single-engine propeller craft and about 30 degrees for business jets.

## Chapter 4

# Maneuvering in the Air

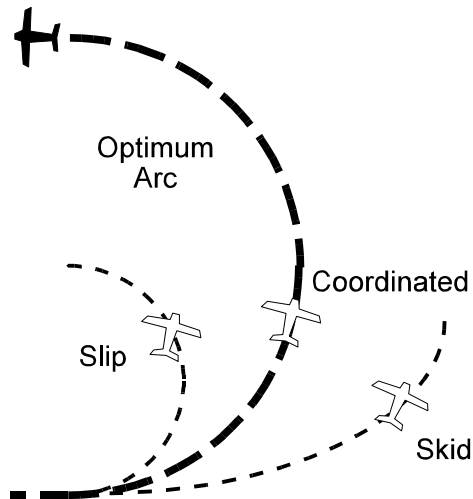
**Aerodynamics.** *Aerodynamics* is atmospheric interactions with aircraft. Airspeed, altitude and drag are three aerodynamic factors that affect and are affected by acceleration.

- ! **Airspeed and Lift.** When airspeed increases, lift increases. The faster the air travels across your airfoils, the more lift those airfoils will produce (within physical limits, of course). This relationship means that whenever you increase airspeed, your aircraft will ascend without changes to the elevator controls. To maintain straight-and-level flight while increasing airspeed, pitch downward slightly by applying forward pressure to the elevator control.
- ! **Altitude and Lift.** Thinner atmosphere at high altitudes provides less air pressure for lift. The higher you go, the more airspeed needed to maintain needed lift until the aircraft reaches its power limits. The higher your altitude, the more power needed to accelerate.

## Chapter 5

### Turning

- ☞ All graphical aids in our books are uncomplicated, easy to understand, and referenced with numbers and captions.



**Figure 5-B:** Turning Skids and Slips

## Chapter 6

# Stalling and Spinning

Stalling and spinning are two flight conditions that are abnormal under most circumstances. Both can be harmful to pilots and aircraft alike. Unrecovered stalls and spins can lead to crashes. Pilots avoid stalling and spinning in normal flight. They deliberately induce them under controlled conditions for learning and practicing how to recognize and recover from them.

### STALLING

A *stall* is an aerodynamic condition in which either or both of the aircraft's wings lose lifting ability. When that happens, the aircraft does not remain in controlled flight and it begins falling from the sky. Different aircraft stall in different ways, and different stalls end in different ways. Most general-aviation aircraft are designed to float long enough for the pilot to regain control. Sometimes, stalls can lead to spins, which are dangerous events that should be avoided. Spins are explained later in this chapter.

## Chapter 7

# The Standard Airport Traffic Pattern

The *standard airport traffic pattern* is a standard visual procedure for arriving, approaching, and landing at uncontrolled airports and a common procedure at many controlled airports. It is frequently called “basic pattern,” “airport pattern,” “pattern” and “circuit.” If you hear or read any of these terms, the standard airport traffic pattern is being discussed.

The traffic pattern explained in this book is a visual flight procedure. Instrument arrivals and approaches are too advanced for this basic flight book and are therefore explained in our *Instrument Flying for Flight-Sim Pilots*.

Flying the standard airport traffic pattern requires most of the skills explained so far in this book, so it is the culmination of your basic flying lessons so far. All simmers who want to simulate flight realistically should be able to perform the standard airport traffic pattern before attempting instrument flight.

## Chapter 8

# The Standard Airport Traffic Pattern

**Final Approach.** The pattern's *final approach* is the portion where the aircraft is aligned with the runway centerline and descends in a straight line to the runway touchdown point. This procedure is explained in Chapter 8, "Approaching and Landing."

**Entry Points.** Aircraft should enter traffic patterns midpoint on the downwind leg. However, aircraft may enter the pattern at the intersection of the crosswind and downwind legs or at the intersection of the upwind and crosswind legs if arriving from either of those directions. Wherever the aircraft enters the pattern, it should fly at least three legs (downwind, base, and final approach). Straight-in entries (entering directly into the final approach without flying any pattern leg) are not permitted at uncontrolled airports. At controlled airports, ATC usually instructs pilots to enter the pattern at positions most convenient to the direction of approach to the airport.

## Chapter 9

# Approaching and Landing

☞ Useful information is provided in easy-to-read tables.

Wind Effects on Approach and Landing	
Wind	Effects
Headwind	Slows ground speed Prolongs approach duration Can seem as though aircraft is moving too slowly Shortens landing-roll distance
Left Crosswind	Pushes aircraft toward right of centerline
Right Crosswind	Pushes aircraft toward left of centerline
Tailwind	Increases ground speed Shortens duration of approach Can seem as though aircraft is moving too fast Increases landing-roll distance
NOTES: Faster winds have greater effects and vice versa. Acute crosswinds have greater effect than obtuse crosswinds. Combined winds have combined effects.	

## Chapter 10

# Flying Multi-Engine Aircraft

🔧 Practical exercises enable you to apply the skills.

### EXERCISE 8

#### Multi-Engine Startup

Using a standard procedure to start the multi-engine aircraft impress upon the pilot the unique demands of an aircraft that depends on more than one engine. This exercise requires a simulator that can start and operate one engine at a time.

1. Select a light multi-engine aircraft such as a Beechcraft Baron, Cessna 310 or Piper Aztec.
2. Start the left engine.
3. Observe the left engine's instrument readings (RPMs, manifold, fuel flow, temperature and oil pressure).

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