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# Instrument Flying for Flight-Sim Pilots

*by Bill Stack*

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## Chapter 1

# What Is Instrument Flight?

*Instrument flight* is flight relying on instruments for precise and safe navigation. Instead of using information from outside their aircraft, pilots flying on instruments depend almost entirely on the instruments inside their aircraft. The only exception is reliance on air traffic control, which of course is outside the aircraft. Few visible signals are used, with the exception of landing approach lights. By this time, however, the pilot has enough visible cues to no longer rely solely on cockpit instruments.

Several guiding features of instrument flight are crucial: **instrument knowledge, instrument procedures, instrument flight rules (IFR), instrument navigation, air traffic control (ATC), and instrument certification.**

## Instrument Knowledge and Dependence

For safe instrument flight, pilots must know their instruments and depend on them almost totally and unconditionally. They must clearly know the messages their flight and navigation instruments are giving them at all times. From reading these instruments, pilots must be able to determine their positions, altitudes, attitudes, headings, airspeeds . . .

## Chapter 2

# Understanding Requirements and Restrictions

Official aviation regulations explain instrument flight rules in detail. Pilots are told explicitly what they can and cannot do when flying under instrument flight rules and whether they can fly IFR in the first place. *Requirements* are things you must do or have in your aircraft for safe, accurate and efficient IFR flight, and *restrictions* are things you cannot do or have. Many of the official regulations are expressed in negative terms even though they are not restrictions, so those regulations are expressed in positive terms in this manual.

These rules are summarized in this chapter and explained in more detail in the relevant chapters. For example, you will generally learn about landing-approach procedures in this chapter and specifically about these procedures in chapter 7, “Approaching and Landing.”

## DETERMINING THE NEED TO FLY ON INSTRUMENTS

The first things to know and understand about instrument flight are the basic conditions under which pilots do so. The first is weather, the second is airspace and the third is as needed. The first two are mandatory, and the third is pilot choice. Once you know that you meet these conditions, you can begin planning your instrument . . .

## Chapter 3

# Using Your Aviation Instruments

Understanding how to use that array of aviation instruments on your cockpit panel is easy once you understand the information they give you and what you do with that information. Knowing what the instruments are and what they do for you is more important than knowing what makes them work.

## TYPES OF AVIATION INSTRUMENTS

Aviation instruments are typically classified in flight training manuals as “pressure” and “gyroscopic,” depending on what makes them work. In some IFR training manuals, they are referred to as “primary” and “secondary,” or “control” and “supporting,” depending on how the pilot uses them. It makes more sense to think of them as flight, navigation, and aircraft instruments — some are used for flying the plane, others are used for navigating and others are used for knowing the aircraft’s condition. You can fly without navigation instruments, and you can navigate without flight instruments, but you cannot fly or navigate safely without aircraft instruments.

## Chapter 4

# Using Charts and Flight Plans

Aviation charts and flight plans are two types of necessary flight documents for every pilot flying on instruments. Using instrument charts and flight plans will facilitate the most realistic instrument flight simulation.

### OFFICIAL AVIATION CHARTS

Instrument aviation charts are necessary for realistic instrument

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*To understand instrument flight procedures, we need to understand the charts. To understand the charts, we need to understand the procedures. So flipping back and forth between this chapter and chapters 5, 6 and 7 might help you understand the concepts and principles.*

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flight simulation. The same charts available to real pilots are available to flight-simulation pilots from . . .

## Chapter 5

# Planning, Taking Off and Departing

Every instrument flight should begin with thorough and effective flight planning. After that fundamental step, you take off visually and begin flying on instruments during your departure of the airport's airspace and entry into the enroute system.

### Planning Your Instrument Flights

Your first step to successful instrument flying is thorough planning. Taking the time to plan is sometimes difficult for flight-sim pilots,

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*To understand instrument flight procedures, we need to understand the charts. To understand the charts, we need to understand the procedures. So flipping back and forth between this chapter and chapters 4 might help you understand the concepts and principles.*

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because there is no risk to not planning. We can advance the throttle, roll down the runway, lift off and begin any flight any time we want without fear of possible problems. Our sense of realism is . . .

## Chapter 6

# Flying Enroute and Holding

Flying enroute and flying holding patterns are two fundamental aspects of instrument flying. “Enroute” means flying along the airways from one airport to another. Those airways are explained in our *Flight-Sim Pilot’s Information Manual* and *Flight-Sim Navigation*. Holding patterns are procedures used by ATC for maintaining adequate separation. Instrument pilots fly holding patterns enroute and for airport instrument approaches.

### Flying Enroute

Flying enroute on instruments means flying from your origin airport’s airspace to your destination airport’s airspace with total reliance on instruments. Real pilots also have enroute assistance from air traffic control, and flight-simulation pilots with ATC capabilities receive some ATC assistance along the way.

Use Optimum Altitudes. An optimum altitude is one that produces the shortest flight duration, uses the minimum fuel and clears terrain and obstacles. As a general guide, flights are usually smoother and more efficient at higher altitudes, because the air becomes thinner . . .

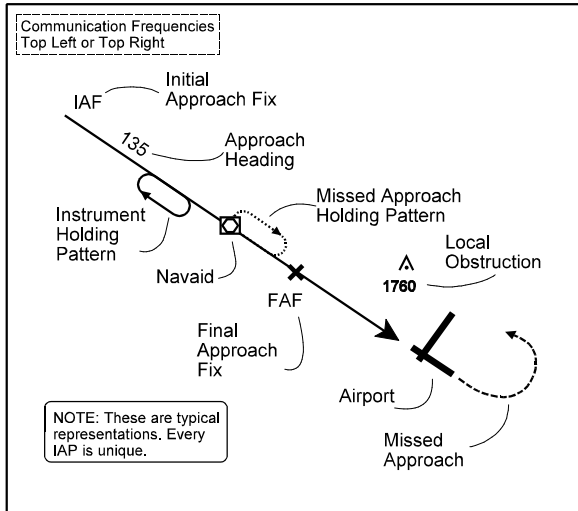
## Chapter 7

# Approaching and Landing

An *approach* is that part of a flight in which the aircraft is placed into the proper or best position for landing on a desired runway. A *landing* is the desired termination of a flight and the desired stopping of an aircraft upon terminating its flight. Approaches can be visual or instrument, but all general-aviation landings are visual. There are two types of instrument approach: **nonprecision** and **precision**, and some aspects are common to all instrument approaches.

Proficiency in instrument approaches and landings is crucial during instrument meteorological conditions. You cannot see where you are, where you are going or what terrain, obstacles other aircraft might be near or ahead of you. So aviation officials developed instrument approach paths and procedures that guide you safely to a position where you can see the runway for a normal landing. The officials also developed safe procedures to use if you cannot land. This consistency of traffic flow keeps air traffic around the airport orderly and enables safe separation of aircraft. When too many aircraft seek to land at a given time, ATC assigns some to holding patterns and clears them to land in order or arrival.

Although instrument approach procedures are based on fundamentals, instrument approaches differ at every runway at every airport. If instrument approach procedures are not prescribed for an airport where you want to land, you must approach it under visual flight rules or land at an airport with prescribed instrument approach . . .



**Figure 4-F:**  
Instrument Approach Procedure Chart — Sample Plan View

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

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### Flight-Sim Navigation

Fly anywhere in your flight simulator with ease. Navigation concepts, methods and terms used by real-world pilots are applied to PC flight simulation to enable flight-sim pilots fly cross country precisely and on time. Plenty of step-by-step explanations, graphical demonstrations and exercises.

### Flight-Sim Pilot's Information Manual

Fly your flight simulator in accordance with real aviation rules, regulations, requirements, restrictions and procedures. Learn about pilot ratings, airports, altitudes, airspaces, air traffic control, weather services, navigation aids and much more. Hundreds of aviation requirements are applied to PC noncombat flight simulation so flight-simulation pilots can make their simulation as realistic as feasible.

### Flight Simulator Flight Plan Forms

Manage your flights as professional pilots do with formal plans. Lay out your routes and waypoints. Indicate your origin, en route and destination airports. Check VFR or IFR flight. Cite departure and arrival times. Record your estimated duration. And much more. Pads of 50 and 100 forms.

### Instrument Flying for Flight-Simulation Pilots

Fly through any weather conditions anytime using instruments as real pilots do. Read cockpit instruments and know what they are telling you. Adhere to IFR requirements and restrictions. Execute instrument procedures properly and

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safely. Use instrument charts and flight plans for safe and timely flights. Detailed explanations, numerous graphical depictions and many practical exercises.

### Top Performance

Get the most from your flight-sim aircraft using the same techniques and procedures real-world pilots use. Know your aircraft's abilities and limits, calculate weight and balance, determine fuel needs, learn to use real performance charts, plan your flights and much more. Detailed explanations, numerous graphical depictions and many practical exercises.

### Jet Simming

Simulate flight in the large and powerful aircraft. Learn proper procedures and professional techniques for flying propjets, business jets, and jet airliners. Learn to read and use advanced instruments found in jet aircraft. Apply the skills with realistic exercises.

### Concorde Simming

Learn to simulate flight in the world's only supersonic airliner. Taxi, take off, climb, cruise, descend, approach, and land subsonic. Climb, cruise, and descend supersonic. Balance fuel. Use Concorde V Speeds. Apply the skills through practical exercises.

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