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SAMPLE SAMPLE

Flight-Sim Pilot's Information Manual

by Bill Stack

With Greg Trainer, Technical Consultant

Lynn Day, Editor

Printed in the United States of America

Chapter 1

Types and Parts of Aircraft

Good basic knowledge for flight simmers regards the aircraft in which they simulate their flights. Accordingly, the official types of aircraft and their significant parts are explained in this chapter. Some of these definitions, descriptions and explanations might seem elementary to some flight simmers, yet even the most seasoned simmer will find revisiting them useful.

Official Definitions of Aircraft

The term "aircraft" has two official uses in aviation, as officially defined by AIM/FAR.

"devices that are used or intended to be used for flight"

"when used in air traffic control terminology, may include the flight crew"

We flight simmers are most familiar with the first definition, which regards the device that flies. Indeed, that is the usage we refer to in this chapter. This definition includes balloons as well as machines such as airplanes and helicopters.

Chapter 2

Pilot Certificates and Ratings

The terms "certificate," "rating" and "authorization" are used freely and frequently in the United States Federal Aviation Administration's (FAA) *Aeronautical Information Manual and Federal Aviation Regulations* (AIM/FAR). However, this fundamental real-world aviation manual does not clearly define them or distinguish the differences among them. From AIM/FAR's usage and dictionary definitions of these words, we offer the following meanings of these common aviation terms.

- A *certificate* is an official government document certifying that a pilot meets specified requirements for flying an airplane and is permitted to do so.

- A *rating* is a type of certificate that applies to a certain type of flying, such as an instrument rating or to a certain type of aircraft, such as a general-aviation or commercial aircraft.

- An *authorization* is an official permission to perform certain operations. For example, Category II and III authorizations allow instrument-rated pilots to use Category II and III instrument approaches. Category II and III authorizations are explained in more detail later in this chapter, and Category II and III instrument approaches are explained in more detail in Chapter 10, "Instrument Flight Rules."

Chapter 3

Airports

Airports Defined and Described

As defined by international aviation authorities, an *airport* is a defined area on land or water that is used or intended to be used for the landing and takeoff of aircraft. It includes all buildings and facilities on the property. *Aerodrome* is another word for airport. A *lighted airport* is one that provides runway and obstruction lighting for darkness and low-visibility weather. An *international airport* is an airport officially designated by a country's customs agency as an airport of entry to that country for customs purposes.

Knowing your way around airports is as important as knowing how to fly. Yet few books on flying describe airport layouts and explain airport features and terms. Airspaces around and above airports are described and explained in Chapter 5, "Airspaces."

Some airport features lay on the ground, some are structures and some are organizations and services.

Chapter 4

Airport Markings, Signs, and Lights

Airport markings, signs, and lights provide information for pilots using airports during day, night, and low-visibility periods. You will find them easy to understand by reading our descriptions and looking for the markings, signs, and lights at many airports you visit in your simulator.

Airport Pavement Markings

Airport pavement markings on runways, taxiways, holding areas, aprons and other paved surfaces in the airport movement areas provide orderly movement by guiding pilots through these areas and showing the intersections and boundaries of these areas.

Runway Markings. Runways are marked to show their major components and numbers and to provide some instructions to pilots. They appear similar on all runways at first glance, but different schemes are used for different runway types. The three types of runways for marking purposes are "visual," "nonprecision instrument approach," and "precision instrument approach." Most marking features are used on all runways, and a few are restricted to certain runway types.

Chapter 5

Airspaces

Different Spaces for Various Needs

As limitless as the big sky appears from the ground, it is quite crowded with every aircraft type imaginable. Congestion is most notable at low levels and near airports. It is severe over large urban areas such as Chicago, London, Los Angeles, Munich, New York and Paris. The most congested airspace in North America is the northeast corridor from Washington, D.C., to Boston, Massachusetts, which is approximately 400 miles long by 100 miles wide (740 by 185 kilometers). It is populated by hundreds of airports, several highly controlled airspaces and numerous airways.

Making the situation worse are the speeds these aircraft travel in these busy airspaces, the innumerable directions they come from and go to, and the many levels they fly at. Airliners have actually crashed into other airliners and general-aviation aircraft in midair, causing hundreds of deaths and injuries.

To maintain safe air travel, the airspaces are divided into segments based on needs and uses. Specific requirements and restrictions apply to the use of each airspace segment. Airspace types can overlap one another. For example, all airspaces have altitudes. Some of those altitudes are called “flight levels” (see “Altitudes and

Chapter 6

Air Traffic Control

This chapter is meant to provide flight simmers with a realistic overview of air traffic control. It is not intended to be a step-by-step guide to all conceivable ATC situations. Experts write entire books about that subject.

Orderly Flow and Pilot Assistance

Air traffic control is necessary for ensuring quick, safe, efficient flight. In real flying, pilots must have clearance to take off from controlled airports, then clearance to enter air traffic routes, and finally clearance to land at controlled airports. At the busiest airports, pilots must have clearance to taxi from the terminal or hangar area to the runways, to enter the approach configuration at the destination airport and to taxi to the terminal or hangar. To ensure everyone's safety, including their own, all pilots are required to follow ATC instructions as precisely as possible.

Various flight-sim programs provide various means of communicating with air traffic controllers. Some provide audio conversations between pilot and ATC, while others provide little more than take-off and landing requests and clearances. When following ATC guidance and clearances from programs that provide full ATC, our flight simulating can be very realistic indeed. Otherwise, we must simulate ATC guidance and clearances ourselves.

Chapter 7

Weather Services

Because weather so greatly affects aviation, many sources of weather information are available to real pilots. Many of them are various government agencies, and some are private sector businesses. We flight-simulation pilots can find adequate weather information from similar sources and some sources of our own. This chapter identifies the major weather-information sources available to pilots, as well as weather sources that flight-sim pilots can use. It does not attempt to explain how weather works in real aviation or flight simulation. Those subjects will be explained in a future book about flight-sim weather.

Aviation Weather Information Sources

Numerous weather services are available to real-world and flight-sim pilots. Most of them are intended for real-world aviation and can be applied to flight-simming to the extent that a given flight-sim game permits.

Aviation Weather Service. *Aviation weather service* is a pertinent weather information service for pilots, aircraft operators and air traffic controllers that is provided by the official weather services and the aviation authorities. Available weather reports and forecasts are displayed at every weather service and flight

Chapter 8

General Flight Rules

General flight rules apply to all visual and instrument flight operations. They are explained herein from basic upward, not in the same sequence listed in the regulations. They are also simplified for flight simulation. For these reasons, we emphasize that our explanation of these flight rules is only for flight simulation, not for real-world aviation. The flight-rule numbers have been applied by us for this manual and do not correspond with flight rules in AIM/FAR. Flight rules for visual flight are explained in Chapter 9, and flight rules for instrument flight are explained in Chapter 10.

General Flight Rule 1
Pilot Certification

To fly in controlled airspaces, a pilot must have appropriate certification for the aircraft type and the flight conditions. For flight simmers seeking realism, this rule means that we should know what we're doing when we fly our aircraft in controlled spaces and in poor weather. Although flight simmers may do anything they want because they are not under the auspices of aviation authorities, this attitude does not foster realistic flight simulation. Pilot certifications are explained in Chapter 2.

Chapter 9

Visual Flight Rules

Visual flight rules are a set of specific regulations, requirements, procedures, restrictions, and prohibitions applied to pilots who are flying under visual conditions.

Visual conditions are those specified by regulation as suitable and safe for flying visually.

Visual flying is flight operations relying mostly on what the pilot can see outside the aircraft for reference. Even when pilots have assistance from ATC and their navigation instruments, they are flying visually when most of their reference information comes from what they can see outside their aircraft.

Visual flying is considered easier than instrument flying. For this reason, it is a minimum level of pilot certification. Accordingly, we recommend that flight-sim pilots develop proficiency with visual flying before attempting higher performance levels.

Chapter 10

Instrument Flight Rules

Instrument Flight Rules (IFR) are a set of regulations that pilots must follow whenever visibility is not suitable for visual flight as well as in certain airspaces. If a pilot is not capable of flying under instruments only, without any visual references from outside the cockpit, then flight operations must not begin or continue, whichever applies.

Rules Regarding Instrument Flight

The actual rules in the aviation regulations regarding instrument flight, commonly called "instrument flight rules," and "IFR," are specific and easy to follow. They are explained herein from basic upward, not in the same sequence listed in the regulations. They are simplified for flight simulation. And they are numbered by us for easy reference (official regulations do not number these rules). For these reasons, we emphasize that our explanation of instrument flight rules is only for flight simulation, not for real-world aviation. Additionally, we explain instrument flying in detail in our *Instrument Flying for Flight Simulation Pilots*.

Appendix A

Common Aviation and Flight-Simulation Abbreviations

This appendix briefly explains abbreviations commonly used in aviation and flight simulation. It is not intended to be a comprehensive listing of all abbreviations because that would require a whole different reference manual. Refer to the index for pages of this book where these subjects are explained.

Appendix B

Flight-Sim Formulas

We flight simmers in the United States are still stuck with British Imperial measurements. Efforts to convert to metric, as most other industrialized nations have done, have met with lukewarm support and some opposition in our country. Consequently, aircraft and flight-sim programs manufactured in the United States are still using British Imperial, while our colleagues in the rest of the world are using metric.

So we prepared these conversion formulas for all flight-simmers to use for converting measurements from one system to the other. For example, if your DME shows that you are 47 miles from a VOR, then you can find that you are 87 kilometers from that VOR. Simply use the formula in the table to convert the distances. Given that 1 nautical mile x 1.852 = 1 kilometer, then 47 nautical miles x 1.852 = 87 kilometers.

Some of the formulas have been rounded for simplicity. Accordingly, these tables are for flight simulation only and should not be used for real-world aviation. We chose to carry the pressure formula to five decimal places because of the precision of those readings.

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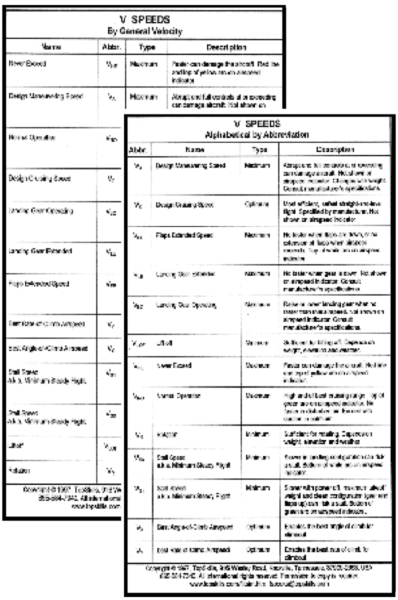

For example, "Vne" means the designated velocity should never be exceeded (it differs for each aircraft).

Your V-speed card lists the most common general-aviation V-speeds in two easy-to-find ways – alphabetically on one side and by velocity on the other side. Each V-speed is identified by name and abbreviation and explained in clear language. These cards are a handy size for using at your flight simulator.

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Flight Simulator Flight Plan Forms

Manage your flights as professional pilots do with formal plans. Lay out your routes and waypoints. Indicate your origin, enroute 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 safely. Use instrument charts and flight plans for safe and timely flights. Detailed explanations, numerous graphical depictions and many practical exercises.

Jet Simming

Enjoy the challenges and rewards of simming in heaviest, most powerful aircraft. Know the fundamentals of jet simming. Easily read advanced jet panels and instruments. Use jet V speeds. Plan and prepare your jet flights – just as real-world jet pilots do. Practice with realistic exercises. All this and more in 300 pages – our biggest flight-sim book.

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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.

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