

Aviation English Course

# 航空专业英语教程

主编

蔡忠元 吴鼎民

审校

昂海松 韩 洁



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## 内 容 提 要

本书是一本集航空专业英语阅读理解、翻译及练习于一体的专业英语教材,主要由三大部分组成:第一部分侧重于阅读理解,包括航空专业各相关部分的内容;第二部分侧重于翻译,包括与第一部分相联系的有关内容;第三部分包括航空科技知识内容。它涵盖了该专业英语的主要词汇。

本书是航空专业领域具有系统性、专业性以及适用性的书,读者对象为高等学校航空相关专业的学生以及航空、民航等部门的相关人员。

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## 编写说明

全国《大学英语教学大纲》要求：大学英语教育要做到四年不断线，学生在前两年完成基础阶段的英语学习，在高年级要继续进行专业英语学习。本书就是按照大纲的这一要求，结合现代航空科技发展的现状而编写的。本教材突出机电一体化的理论与实际，既可供航空类院校的相关专业作为专业英语教材使用，也可作为航空、民航相关从业人员的英语进修和提高所使用。

早在1995年，中国民用航空总局开始实施一项“民航英语工程”。受总局的委托，我们制订了《民航英语工程(机电)考试大纲》，并以大纲为依据编写了一本讲义《航空英语读译教程》，供参加民航英语工程(机电)英语考试的人员进修和备考使用。四年多来，多家航空公司和有关院校的高年级学生上千人使用过本书的讲义。他们是：北方航空公司、北方天鹅航空公司、新疆航空公司、西北航空公司、南京航空公司以及西北工业大学、南京航空航天大学的有关院系。所有的使用单位都对教材予以较高的评价，并提出不少宝贵的修改意见。为此，我们对原讲义进行了多次改进加工，对部分内容作了更新和调整。经过不断使用和修订，终于在原讲义的基础上形成了这本《航空专业英语教程》。

在本书出版之前我们特聘请了南京航空航天大学飞行器系主任、博士生导师昂海松教授、外语系韩洁教授以及学报编辑部熊春茹副教授审校了全书。请他们在专业内容和英、汉两种文字上审核把关，力臻完善。

本书分为三大部分。第一部分侧重于提高阅读理解水平，内容包括航空器分类、飞机部件、飞行原理、飞行操作、飞机发动机、滑油系统、燃料系统、点火系统、电气系统、飞行仪表，以及电气系统故障隔离等。课文后列有词汇和短语、难点注释和翻译、阅读理解正误判断题以及术语和短语翻译题。第二部分侧重提高学习者的翻译能力，内容包括空气动力学和文明、飞机的诞生、早期的飞机、飞机制造、直升机、航天飞机、飞机发动机、计算机在航空器结构上的应用、液压控制、控制系统工程、自动控制的应用、飞行仪表的使用、喷气发动机、动力装置形式、生产过程中自动化的基本问题、现代导航概论、制导和控制系统，以及组装工具和航空器的焊接。课文后列有词表和短语以及中文参考译文。此两部分既适用于课堂教学，又方便无法参加集体培训者自学。第三部分选编了一定量的航空科技专业阅读材料，包括航空工业的发展历史以及航空器的基本知识，供学习者凭借专业词典阅读和翻译，以求得在第一、第二部分牢固掌握的基础上进一步得到提高。此三部分内容基本上涵盖了航空机电专业英语的主要内容和词汇。

曾经参加过本书讲义编写工作的有南航外语系的夏春云老师，西北航空公司的张卫华和章怡工程师。南航教务处吴晓玲副处长对本书的出版给予了积极的支持和帮助，孔晓昔同志对本书的录入排版做了大量的工作。在此书即将出版之际，我们对以上同志表示深深的感谢。

本书篇幅有限，内容难免挂一漏万，加之编者水平有限，难免顾此失彼，以造成众多不足。凡不足谬误之处，均属编著者所为。对此，敬请广大读者和同行不吝赐教，以图共同提高。

编著者

2000年春于南京

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**Part I**

**Reading Comprehension**



# Lesson One

## Text

### The Classification of Aircraft

Although all airplanes are aircraft, not all aircraft are airplanes. An aircraft is any structure that is intended for navigation through the air and that is supported either by its own buoyancy or by the dynamic action of the air against its surfaces. A brief look at the various kinds of aircraft is in order, since you may fly a number of them during your aviation career and since FAA rules for pilot or airman certification are based on aircraft classification. The classification begins with categories; within a category, specific classes are identified; and within a class, types are identified.

**Category** Aircraft that use the same method of staying aloft and use similar means of propulsion are grouped into the same category. This is the broadest classification of aircraft. The FAA currently recognizes the four categories of aircraft shown in Figure 1. 1: lighter-than-air, rotorcraft, glider and airplane.

**Class** Within each category, aircraft with similar operating characteristics are grouped into a class. For instance, within the airplane category there are four classes: single-engine land, single-engine sea, multiengine land, and multiengine sea.

**Type** When you refer to a specific make and model of aircraft, you are defining its type. Here are some aircraft types you may be familiar with: Cessna 152, Piper Tomahawk, Beech Bonanza, Boeing 727, McDonnell Douglas DC-10.

### The Different Categories and Classes of Aircraft

**Lighter-than-air** aircraft ascend by displacing a free mass of heavier air with an enclosed mass of lighter gas. There are two classes of lighter-than-air aircraft: balloons and airships. Balloons are unpowered aircraft that ride air currents. Hot-air balloons were common in the nineteenth century and are used today for sport. Airships are powered and have controls to direct their movement. Inflatable/deflatable airships are called blimps. Dirigibles are airships built on rigid frames; the famous German Zeppelins were dirigibles.

A rotorcraft is easily recognized by its large overhead propeller, called a rotor. There are two classes of rotorcraft: helicopters and gyroplanes. Helicopters have powered rotors that provide both vertical and horizontal motion through the air. On a gyroplane the rotor is freewheeling; propulsion is provided by an engine and propeller mounted in either a tractor

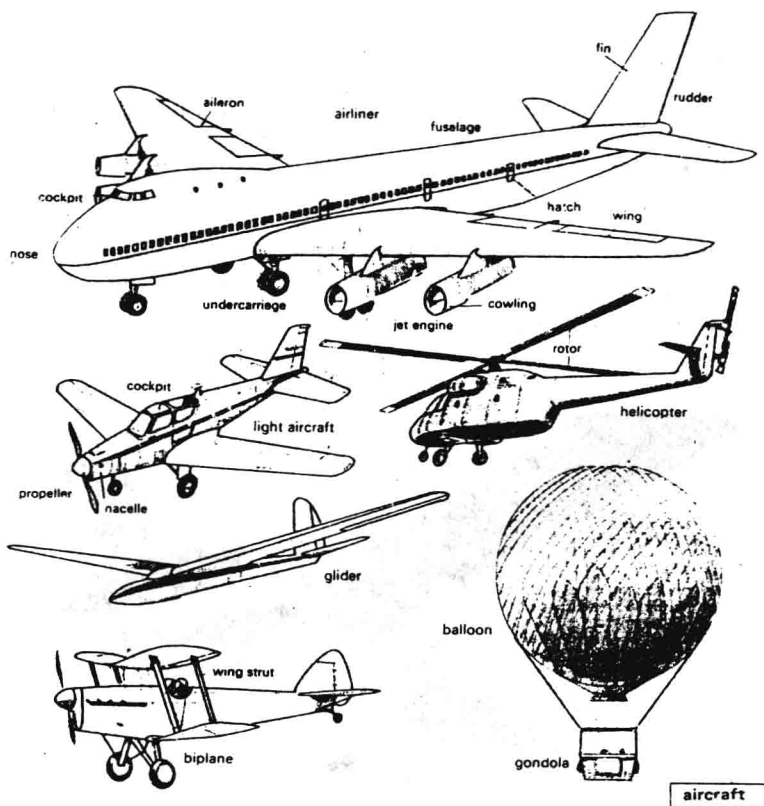


Figure 1.1 Types of aircraft

(pulling) or pusher configuration.

A glider is an unpowered aircraft with wings and a tail. A sailplane is a high-performance glider capable of remaining aloft on rising air currents. These aircraft can be towed aloft by an airplane or a winch, or they can be launched over the edge of a cliff. Once aloft, a glider or sailplane is always coasting down through the air immediately around it. A sailplane pilot stays aloft by finding rising air currents produced by the local terrain or weather conditions.

An airplane is a powered aircraft with wings and a tail. The airplane category has four classes: single-engine land, single-engine sea, multiengine land, and multiengine sea. Chapter 2 is devoted to describing airplanes and how they fly.

These descriptions of category, class, and type are used by the FAA in defining pilot limitations. Your pilot certificate will always specify each category and class of aircraft you may legally operate. When you move up to jet-powered aircraft or any aircraft that has a maximum takeoff weight of over 12,500 pounds (about the size of a Lear jet or bigger) you will need a type rating in each make and model you fly. The term "category" is also used in

another context; In the certification of aircraft, category refers to the operating limitations or intended use of the aircraft. The aircraft's Operating Handbook will discuss each category for which it is certified and the limitations to be observed.

There is one type of airborne vehicle that is not recognized by the FAA. An ultralight is a lightweight, single-person, recreational aircraft like that shown in Figure 1. 2. The FAA defines these as "vehicles" and does not regulate their design or construction. You do not need a pilot's certificate to fly one.

You will need a pilot's certificate to fly any kind of airplane, and you will need training before you can obtain that certificate.

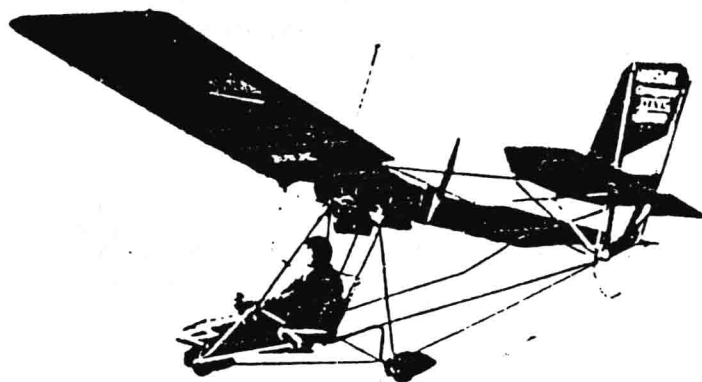


Figure 1. 2 An ultralight

### New Words and Expressions

classification /ˌklæsɪfɪˈkeɪʃən/ *n.*

分类

airplane /ˈeəpleɪn/ *n.*

飞机

aircraft /ˈeəkra:ft/ *n.*

航空器, 飞行器(如飞机等)

intend /ɪnˈtend/ *v.*

意指, 意思是, 原意

navigation /næviˈgeɪʃən/

(船只或飞机的)航行

buoyancy /ˈbɔɪənsi/ *n.*

浮力

dynamic /daɪˈnæmɪk/ *a.*

动力的, 动态的, 动的

surface /ˈsɜ:fɪs/ *n.*

表面

various /ˈvɛəriəs/ *a.*

各式各样的, 许多的

aviation /eɪvɪˈeɪʃən/ *n.*

航空, 航空学, 航空工业

career /kəˈrɪə/ *n.*

职业, 事业, 生涯

FAA Federal Aviation Administration

(美) 联邦航空局

pilot /ˈpaɪlət/ *n.*

飞机驾驶员

airman /ˈeəmæn/ *n.*

飞行员, 飞机师

certification /'sə:tifi'keiʃən/ <i>n.</i>	证明,证明书
category /'kætigəri/ <i>n.</i>	类别,类型
specific /spe'sifik/ <i>a.</i>	清楚的,明确的,详细的
class /'kla:s/ <i>n.</i>	种类,等级
identify /ai'dentifai/ <i>v.</i>	认明,指认出,辨认出
type /taip/ <i>n.</i>	类型,种类,样式
aloft /ə'lɔft/ <i>adv.</i>	在高处
propulsion /prə'pʌlʃən/ <i>n.</i>	推进力
currently /'kʌrəntli/ <i>adv.</i>	时下,当今
rotorcraft /'rəʊtəkra:ft/ <i>n.</i>	旋翼式飞行器
glider /'glaidə/ <i>n.</i>	滑翔机
characteristic /,kæriktə'ristik/ <i>n.</i>	特性
single-engine /'siŋgl'endʒin/ <i>n.</i>	单引擎
multiengine /mʌlti'endʒin/ <i>n.</i>	多引擎
refer to /ri'fə:/ <i>v. prep.</i>	提起,说起,指
make /meik/ <i>n.</i>	样式,牌子
model /'mɒdl/ <i>n.</i>	模型,样式
define /di'fain/ <i>v.</i>	下定义,阐释
be familiar with	对……熟悉
lighter-than-air <i>a.</i>	轻于空气的(飞行器,如飞艇)
ascend /ə'send/ <i>v.</i>	上升
displace /dis'pleis/ <i>v.</i>	替代,取代
mass /mæs/ <i>n.</i>	团,块
enclose /in'kləuz/ <i>v.</i>	封闭,包围
gas /gæs/ <i>n.</i>	气体
balloon /bə'lu:n/ <i>n.</i>	气球
airship /'eə,ʃip/ <i>n.</i>	飞艇
unpowered /,ʌn'pauəd/ <i>a.</i>	无动力的
ride /raid/ <i>v.</i>	漂浮而行,飘行
current /'kʌrənt/ <i>n.</i>	气流
control /'kɒntrəʊl/ <i>n.</i>	操纵装置,控制
direct /di'rekt/ <i>v.</i>	指挥,指引,指示
movement /muvmənt/ <i>n.</i>	运行,动作
inflatable /in'fleitəbl/ <i>a.</i>	可充气的
deflatable /di'fleitəbl/ <i>a.</i>	可放气的
blimp /blimp/ <i>n.</i>	充气的飞艇
dirigible /'diridʒəbəl/ <i>n.</i>	(指可驾驶的)飞船
rigid /'ridʒid/ <i>a.</i>	稳固的,坚硬的,刚性的
frame /freim/ <i>n.</i>	支架,框架

overhead /'əʊvə'hed/ <i>adv. /adj.</i>	在头顶上
propeller /prə'pelə/ <i>n.</i>	推进器,螺旋桨
rotor /'rəʊtə/ <i>n.</i>	旋翼
helicopter /'helikɒptə/ <i>n.</i>	直升机
gyroplane /'dʒaɪərəpleɪn/ <i>n.</i>	旋翼机
vertical /'vɜ:tɪkəl/ <i>a.</i>	垂直的,垂直起降的
horizontal /hɒrɪ'zɒntəl/ <i>a.</i>	水平的
motion /'məʊʃən/ <i>n.</i>	运动,移动
freewheeling /'fri:'wi:lɪŋ/ <i>a.</i>	不受拘束的,行动自由的
mount /maʊnt/ <i>v.</i>	安装,装上,安上
tractor /'træktə/ <i>n.</i>	牵引机,曳引机
pusher /'puʃə/ <i>n.</i>	推动器
configuration /,kɒnfigju'reɪʃən/ <i>n.</i>	轮廓,外形,布局,构形
wing /wɪŋ/ <i>n.</i>	机翼
tail /teɪl/ <i>n.</i>	后部,尾部
sailplane /'seɪlpleɪn/ <i>n.</i>	轻滑翔机
high-performance /,haɪpə'fɔ:məns/ <i>n.</i>	高性能
tow /təʊ/ <i>n.</i>	拖,曳
winch /wɪntʃ/ <i>n.</i>	绞盘,绞车
launch /lɔ:ntʃ/ <i>v.</i>	用力抛掷,发射
edge /edʒ/ <i>n.</i>	边,边沿
cliff /klɪf/ <i>n.</i>	悬崖,峭壁
terrain /'tereɪn/ <i>n.</i>	地势,地形,地带
condition /kən'dɪʃən/ <i>n.</i>	情况,状态,条件
devote to /dɪ'vəʊt/ <i>v. prep.</i>	致力于
limitation /lɪmɪ'teɪʃən/ <i>n.</i>	限制
certificate /sə'tɪfɪkeɪt/ <i>n.</i>	证书
specify /'spesɪfaɪ/ <i>v.</i>	指定,指明,载明
legally /'li:gəli/ <i>adv.</i>	合法地
operate /'ɒpəreɪt/ <i>v.</i>	操作
jet-powered /,dʒet'paʊəd/ <i>a.</i>	喷气动力的
maximum takeoff weight	最大起飞重量
rating /'reɪtɪŋ/ <i>n.</i>	(机器以其大小所定的)等级
context /'kɒntekst/ <i>n.</i>	情况,状况
handbook /'hændbuk/ <i>n.</i>	手册
airborne /'eəbɔ:n/ <i>a.</i>	飞行的,空运的
vehicle /'vi:ɪkl/ <i>n.</i>	交通工具,运输工具
recognize /'rekəgnaɪz/ <i>v.</i>	承认,认可
ultralight /'ʌltrəlaɪt/ <i>a.</i>	超轻型的

regulate /'regjuleit/ <i>v.</i>	管制, 规定
design /di'zain/ <i>n.</i>	设计
construction /kən'strʌkʃən/ <i>n.</i>	建造

## Notes

1. An aircraft is any structure that is intended for navigation through the air and that is supported either by its own buoyancy or by the dynamic action of the air against its surfaces.  
航空器指的是任何用于空中航行的装置。它或依靠自身浮力支撑,或依靠空气对其表面产生动力作用支撑。  
intended for, 以...为意图,以...为目的  
either...or..., 不是...就是,或...或...
2. A brief look at the various kinds of aircraft is in order, ...  
简单地看一看这些不同种类的航空器,就会对此感到一目了然。  
这里的 in order, 应理解成“一目了然”,“一清二楚”。
3. Aircraft that use the same method of staying aloft and use similar means of propulsion are grouped into the same category.  
使用同样的方法停留在空中,和用相似的推进装置的航空器被归为同一类型。  
staying aloft: staying in the air 停留在空中  
grouped into: 被划分为

## Exercises

### I. Tell whether the following statements are true (T) or false (F).

1. An aircraft is any structure that is intended for navigation through the air and that is supported either by its own buoyancy or by the dynamic action of the air against its surfaces.
2. Aircraft that use the same method of staying aloft and use similar means of propulsion are grouped into different category.
3. Within the airplane category there are two classes.
4. Lighter-than-air aircraft ascend by displacing a free mass of heavier air with an enclosed mass of lighter gas.
5. Helicopters have powered rotors that provide only horizontal motion through the air.
6. Propulsion is provided by an engine and propeller mounted in a tractor and pusher configuration.
7. A glider is a powered aircraft with wings and a tail.
8. Airships are powered and have controls to direct their movement.

**II. Translate the following into Chinese.**

1. during one's aviation career
2. stay aloft
3. similar means of propulsion
4. a high-performance glider
5. rising air currents
6. the local terrain or weather conditions

# Lesson Two

## Text

### The Parts of an Airplane

Figure 2.1 shows the basic components of an airplane. Although each manufacturer and each model have their own design features, these general components are found on every airplane and are called by the same names. The entire structure of an airplane is called the airframe. The components of the airframe are: the wing, the fuselage, and the tail assembly, or empennage.

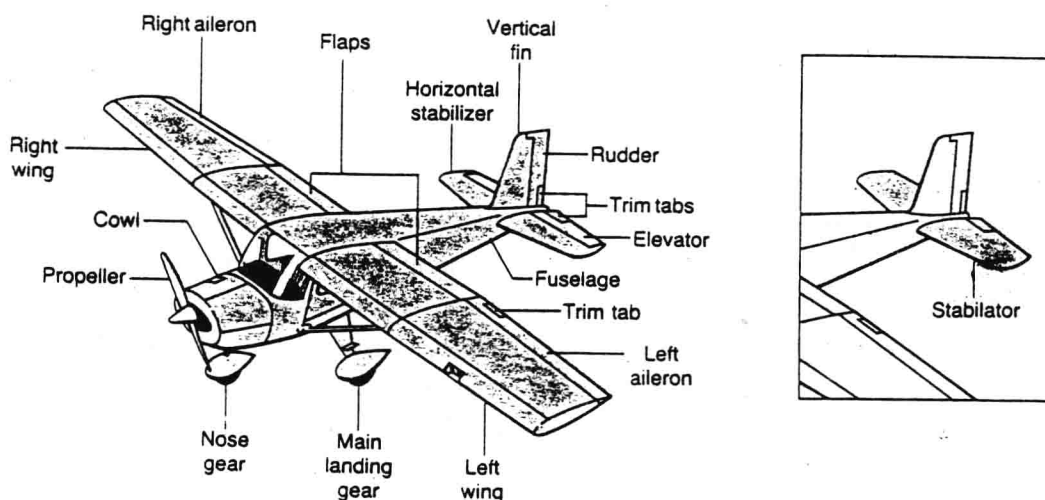


Figure 2.1 The parts of an airplane

Wings are the major characteristic of an airplane. Wings can be mounted above the cabin (high wing), below the cabin (low wing), or anywhere between (mid wing). Each manufacturer has its own preference. Most modern airplanes are monoplanes; that is, they have one wing. Airplanes with two wings are called biplanes. There have even been triplanes, the most famous of which was the Fokker triplane flown by the Red Baron in World War I.

On the trailing (rearmost) edge of the wing are two sets of movable surfaces. Those farthest from the center of the airplane (outboard) are called ailerons. The ailerons move when you turn the control wheel or move the control stick side to side. They move in opposite directions, one going up while the other goes down. Flaps are the movable surfaces closest to the center (inboard). They are controlled by a lever or switch in the cockpit. Flaps only move downward (sometimes backward as well as downward), and both flaps always move simultaneously.



On most airplanes, the wings contain the fuel tanks. This is both structurally efficient and practical. The weight of the fuel is distributed along the structure that is doing the lifting, and it leaves the rest of the airframe available for other things, like people and cargo.

When you observe an airplane from the front or rear, you will notice that the wings are not parallel to the ground but form a slight V (see Figure 2. 2). This angle is called dihedral. The purpose of dihedral will be discussed later in this chapter.

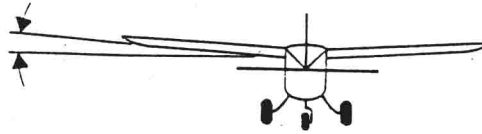


Figure 2. 2 Wing dihedral

The fuselage is the body of the airplane. It holds the pilot, passengers, and cargo. The fuselage is designed to be as small as possible for performance reasons yet spacious enough for comfort.

The tail assembly or empennage consists of two sets of surfaces, usually one horizontal and one vertical. (There are airplanes that use a V configuration, but these are not discussed here to reduce confusion.) The vertical element has a fixed part called the vertical stabilizer and a movable part called the rudder. The rudder is controlled by pedals on the cockpit floor. The horizontal surface usually has a fixed horizontal stabilizer and a movable elevator. On some airplanes the entire horizontal surface moves, in which case it is called a stabilator. The elevator or stabilator is controlled by the fore and aft movement of the control wheel or stick.

The engine and propeller on most single-engine airplanes are mounted on the front of the fuselage. This is called the tractor (pulling) configuration. The protective skin around the engine is called the cowl. It provides a smooth exterior surface and channels cooling air around the engine.

The undercarriage of an airplane is its landing gear. Early airplanes had two main wheels under the fuselage or wings and a smaller wheel under the tail. Since this was the original method of designing landing gear, it is called conventional landing gear (see Figure 2. 3). Today most airplanes are designed with the main wheels farther aft on the fuselage or wing and with a nose wheel rather than a tail wheel. This is the tricycle configuration. Tricycle gear airplanes are easier to control on the ground, especially during landing.

The landing gear on an airplane is either fixed or retractable. Fixed gear is cheaper, easier to maintain, and foolproof (you don't have to remember to put it down before landing). Aerodynamically, a retractable gear is preferable because with the wheels and struts placed inside the wing or fuselage, there is less interference with the flow of air.