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# How Was Aviation Developed?

## Unit 1

### Learning Objectives

In this unit, you are expected to

- understand the process of realizing humans' flying dream;
- explain the roles of war in aviation development;
- get to know some early aviators/pioneers and their efforts and contributions;
- make a brief summary on the history of aviation via a mind map;
- write a biography which includes both the basic information and your views on the person.

## Section A

### Listening and Speaking

**1** Work in pairs and share your views about the following questions with your partner.

- 1 Is it possible for human beings to fly like a bird with a pair of wings? And why?
- 2 There are many stories about flying in ancient China, like the Goddess Chang'e flying to the moon and the Cowherd and the Weaver Girl. Do you have any other stories about flying in ancient China?
- 3 What might be the possible factors that contribute to the birth of aviation?

**2** Listen to an audio clip and fill in the blanks with appropriate words or expressions.

#### Word Bank

rather than; nevertheless; in the course of; steam-powered; persistent effort; enthrall; aerobatics; altitude; aviator

Having spent centuries watching birds with 1) \_\_\_\_\_ and envy, humans eventually took to the air in the late 18th century. It was, in fact, in a 2) \_\_\_\_\_ rather than on the wing. Nevertheless, the desire to 3) \_\_\_\_\_ through the air like a bird remained. In the course of the 19th century, scientists and inventors worked on the basic principles of flight, experimenting with gliders and ungainly 4) \_\_\_\_\_ flying machines and models. But it took the persistent efforts of the Wright brothers, in experiments between 1899 and 1905, to finally achieve the practical powered 5) \_\_\_\_\_ flight. The period up to 1914 brought spectacular progress. The public was enthralled by long-distance flying races and displays of aerobatics, while new speed and 6) \_\_\_\_\_ records were posted yearly, although at the cost of the lives of many aviators.

**3** Listen to the audio clip again and make an oral summary with two to three sentences.

### Reading

# The Door to Aviation

It is probable that future war will be conducted by a special class, the air force, as it was by the armored knights of the Middle Ages.

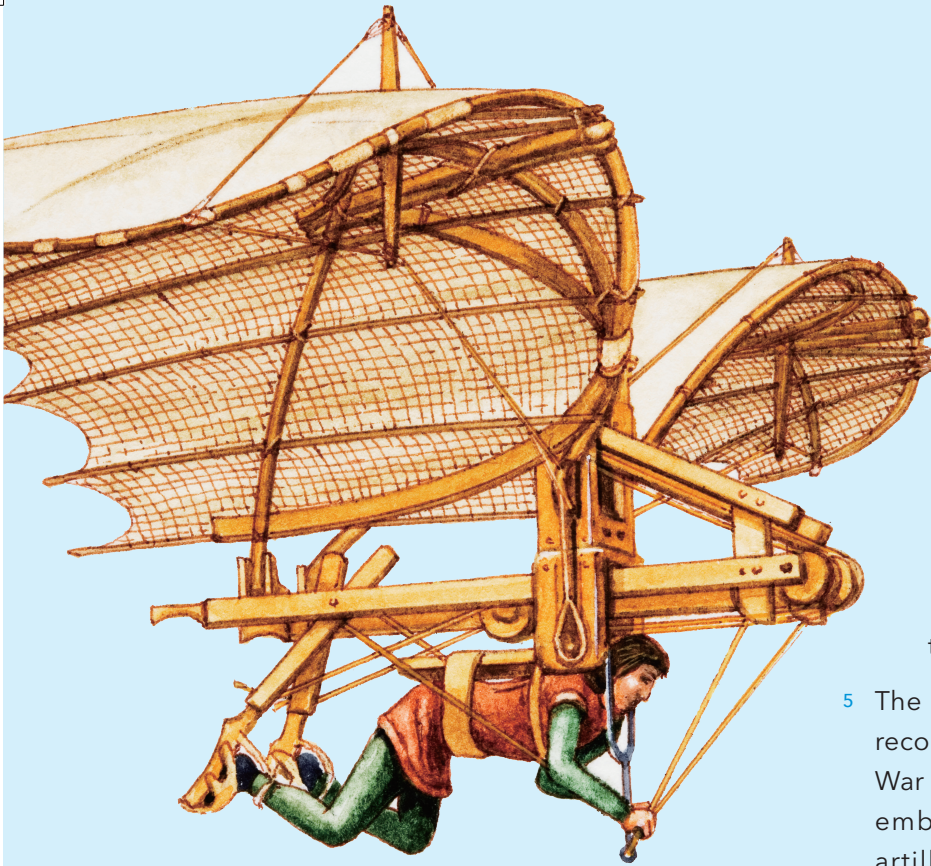
—William Mitchell, US Army officer & military strategist

#### Instruments to fly

- 1 Myth and folklore were rich in tales of airworthy vehicles that might carry the weight of a human, from various chariots of the gods to witches' broomsticks. The idea of a "flying machine" was picked up by English philosopher Roger Bacon in the 13th century. Bacon declared himself certain that humans could build "instruments to fly," involving a mechanism that would flap wings. Such "ornithopters" also obsessed the imagination of Italian Renaissance genius Leonardo da Vinci. "There is in man [the ability] to sustain himself by the flapping of wings," Leonardo wrote. In the many sketches of flying machines found in his notebooks, the most promising idea is a screw-like propeller that he hoped would spiral into the air—a remote foreshadowing of a helicopter.

#### Instruments of the wars

- 2 If no one could see how to make a machine that would fly, they could possibly see why you want to—especially in militaristic Europe. In 1670, Francesco Lana de Terzi pointed out that an airship lifted by spheres from which the air had been pumped to create a vacuum could be used to land troops to capture a city in a surprise attack, or to destroy houses and fortresses by dropping "fireballs and bombs."



- 3 As assumed by de Terzi, soon after the invention of the first man-carrying lighter-than-air flying machine—a hot-air balloon invented by the Montgolfier brothers in 1783, those balloons were put into war instead of just delivering passengers and mail. The first military use of the balloon followed in 1794, by the French to observe the enemy during the Battle of Fleurus. The use of lighter-than-air aircraft in warfare became prevalent in the 19th century, including regular use in the American Civil War.
- 4 With the advancement in technology in the early 20th century, heavier-than-air aircraft gradually replaced the lighter-than-air vehicles and soon found their first practical use in war. The US Army Signal Corps purchased a Wright Model A from the Wright brothers on August 2, 1909 which became the first military aircraft in history. In the fall of 1911, Italy declared war on Turkey in a dispute over the territory now known as Libya. The Italian army possessed a number of aircraft—Blériots, Farmans, Nieuports and Taubes. An air fleet, initially comprising just nine airplanes and 11 pilots, was sent off with the Italian force that embarked for the Libyan coast in North Africa. In the short but brutal

war that followed, the airplanes performed creditably, carrying out reconnaissance missions, mapping areas of the desert, and dropping propaganda leaflets, promising a gold coin and sack of wheat to all those who surrendered. Despite the fact that they faced little opposition from the Turkey army, those aviators were hailed as heroes by patriotic Italians after the war.

- 5 The earliest military role filled by aircraft was reconnaissance, however, by the end of World War One (WWI), aircraft in military had rapidly embraced many specialized roles, such as artillery spotting, air superiority, bombing, ground attacks and anti-submarine patrols. Technological improvements were made at a frenzied pace. For example, Fokker introduced his Eindecker series of monoplanes equipped with fixed, synchronized, forward-firing machine guns during this war and they would become known on the Western Front as the “Fokker Scourge.” Other aircraft such as the DH-4 were used in battle as bombers or in support of advancing ground forces. Another important force in the world of aviation would find the wartime experience invaluable in staking its claim to the future—Rolls-Royce. Rolls-Royce came out of WWI, ready to take its place as one of the foremost manufacturers of aircraft engines.
- 6 In short, the aircraft that emerged from WWI turned out to be sleeker, faster, more powerful and better armed. WWI saw the introduction of the low-wing aircraft, the all-metal body and the thickened cantilever wing. The mass production of aircraft needed to supply the war effort had supported many of the newly emerging aviation companies. With the end of the war, most of these companies had to find other means of support although the military was still the best game in town and the lucky few would continue

to research and produce the newest weapon in the military arsenal.

- 7 The airplane had grown far more deadly in the decade leading up to World War Two (WWII), but another invention was to be the salvation of Britain during the early years of the war. Radar, an outgrowth of the radio experiments, sent radio waves out into the atmosphere and measured the time that elapsed before the signal reflected off of a solid object and returned to the receiver. The UK had begun deploying this new technology along their coast before the start of WWII and its use during the early years of the war helped Britain beat back the waves of German bombers that streamed across the English Channel. In addition to detecting incoming aircraft, the system could be used to direct intercepting aircraft to their target, help aircraft determine their height from the ground, and identify friendly and enemy aircraft with the use of small broadcasting beacons. The “enemy” would eventually deploy radar as well, but the invention of the multi-cavity magnetron which generated microwaves and required a smaller antenna would continue to give the British an advantage during the war. Of course, this new technology had civilian applications and would become the backbone of the civil aviation systems that developed after the end of WWII. In fact, the system currently in use today to track, identify and direct aircraft is not very different from this early system.

#### Passengers on board

- 8 The first sustained passenger airplane services were established in Europe in the immediate aftermath of WWII. When the first daily international scheduled air service, between Hounslow, London, and Le Bourget, Paris, began in August 1919, the passengers traveled in open cabins and wore protective clothing against the cold. Conditions on European passenger lines soon became less spartan, yet even in enclosed

cabins passengers were subjected to deafening noise, sickening turbulence, bone-shaking vibration and either stifling heat or freezing cold.

- 9 For a long time, flight remained an uncomfortable, expensive and unreliable way to travel. The speed advantage aircraft enjoyed over the frequent and punctual trains that linked European cities was, to a large extent, undermined by the time it took to travel to and from airdromes. It was also unprofitable. No airplane could carry enough passengers to cover costs. When European passenger air services developed after the war, it was less in response to public demand than to the needs of aircraft manufacturers, which, faced with the collapse of the military market at the end of the war, had to find another use for the aircraft they produced. Passenger transportation offered a practical alternative to bankruptcy. It was logical that the French airline Compagnie des Messageries Aériennes should have been created by the joint action of France’s leading airplane makers—Blériot, Farman, Caudron, Morane, Renault and Bréguet. Similarly, in Germany, manufacturers such as Junkers and Albatros were involved in setting up airlines. The ready availability of ex-military pilots and cheap war-surplus airplanes also encouraged adventurous entrepreneurs to try establishing passenger services run on shoestring budgets.
- 10 Indeed, the development of flight was conditioned by national and imperial rivalries. European governments were persuaded of the need to encourage commercial aviation actively because they saw it as part of the struggle for national prestige and national defense. They recognized the need to maintain air technology and manufacturing capacity for possible future wars. And they saw in aircraft a means to bind together their far-flung empires.

## Culture Notes

### 1 Francesco Lana de Terzi

弗朗切斯科·拉纳·德·泰尔齐，数学家、物理学家、航空学先驱。弗朗切斯科提出了真空飞船的概念，并通过精确的数学计算，建立了空中飞行假说，从而将航空变成一门科学。

### 2 spartan

该词在文中的意思为“艰苦的”。作名词时，意思为“守纪律的人、勇敢的人”，这两层意思都和斯巴达有关。“斯巴达”是“Sparta”的音译，古希腊城邦，以严明的纪律和军事贵族寡头统治而闻名。

## New Words

**aviation** <术语> /ˌeɪvɪ'eɪʃən/ *n.*

the activity of flying aircraft, or of designing, producing, and keeping them in good condition  
航空，航空制造业

**folklore** ★ /'fəʊklɔː/ *n.*

the traditional stories of a country or community  
民间传说

**airworthy** <术语> /'eə,wɜːði/ *adj.*

a plane that is airworthy is safe to fly 适航的

**chariot** ☆ /'tʃæriət/ *n.*

a vehicle with two wheels pulled by a horse, used in ancient times in battles and races 双轮马车

**mechanism** ★★★★★ /'mekənɪzəm/ *n.*

a set of moving parts in a machine that performs a task 机械装置

**ornithopter** <术语> /'ɔːnɪθɒptə/ *n.*

a machine shaped like an aircraft that is held aloft and propelled by wing movements 扑翼飞机

**Renaissance** ★★ /rɪ'neɪsəns/ *n.*

the period of time in Europe during the 14th, 15th and 16th centuries when people became interested in the ideas and culture of ancient Greece and Rome, and used these influences in their own art, literature, etc. 文艺复兴时期

**flap** ★ /flæp/ *v.*

to move quickly up and down 振（翅）

**propeller** <术语> /prə'pelə/ *n.*

a device with two or more blades that spin around, which makes an aircraft move 螺旋桨

**airship** <术语> /'eə,ʃɪp/ *n.*

a large aircraft without wings, filled with gas, which is lighter than air, and driven by engines  
飞艇，飞船

**sphere** ★★★★★ /sfɪə/ *n.*

any object that is completely round, for example, a ball 圆球，球状物

**vacuum** ★★★ /'vækjuəm/ *n.*

a space that is completely empty of all substances, including all air or other gas 真空

**fortress** ★ /'fɔ:trɪs/ *n.*

a building or place that has been made stronger and protected against attack 堡垒, 要塞

**balloon** ★★ /bə'lun/ *n.*

a large bag of strong light cloth filled with gas or heated air so that it can float in the air 热气球

**reconnaissance** <术语> /rɪ'kɒnɪsəns/ *n.*

the activity of getting information about an area for military purposes, using soldiers, planes, etc. 侦察

**propaganda** ★★★ /prɒpə'gændə/ *n.*

ideas or statements that may be false or exaggerated and that are used in order to gain support for a political leader, party, etc. 宣传, 鼓吹

**aviator** <术语> /'eɪviətə/ *n.*

a person who flies an aircraft 飞行员, 飞机驾驶员

**frenzied** ☆ /'frenzɪd/ *adj.*

frenzied activities or actions are wild, excited and uncontrolled 疯狂的

**monoplane** <术语> /'mɒnəpleɪn/ *n.*

an airplane with a single wing on each side 单翼机

**arsenal** ★ /'ɑ:sənəl/ *n.*

a military structure where arms and ammunition and other military equipment are stored 军械库, 军火库

**outgrowth** ☆ /'aʊtgrəʊθ/ *n.*

sth. that is an outgrowth of another thing has developed naturally as a result of it 衍生物, 副产物

**elapse** ★★ /ɪ'læps/ *v.*

(of time) to pass or go by (时间) 流逝

**beacon** <术语> /'bi:kən/ *n.*

a radio or radar signal used by aircraft or boats to help them find their position and direction 无线电 (雷达) 信标

**magnetron** <术语> /'mægnɪtrɒn/ *n.*

an electronic valve with two coaxial electrodes used with an applied magnetic field to generate high-power microwave oscillations, especially for use in radar 磁控管

**antenna** ★ /æn'tenə/ *n.*

an electrical device that sends or receives radio or television signals 天线

**backbone** ☆ /'bækbəʊn/ *n.*

a central cohesive source of support and stability 支柱

**aftermath** ★ /'ɑ:ftəmæθ/ *n.*

the consequences of an event (especially a catastrophic event) 后果, 余波

**turbulence** ★ /'tɜ:bjələns/ *n.*

violent and uneven movement within a particular area of air, liquid, or gas 湍流, 紊流

**stifling** ☆ /'stɑ:flɪŋ/ *adj.*

extremely hot and unpleasant 热得难受的

**airdrome** <术语> /'eədrəʊm/ *n.*

an airfield equipped with control tower and hangers as well as accommodations for passengers and cargo 飞机场

**bankruptcy** ★★★ /'bæŋkrʌptsi/ *n.*

the state of being bankrupt 破产

**entrepreneur** ★★ /ɒntrəprə'nɜ:z/ *n.*

a person who starts a new business or arranges business deals in order to make money 企业家

**shoestring** ☆ /'ʃu:striŋ/ *adj.*

a shoestring budget is one where you have very little money to spend (预算) 小额的

**rivalry** ★★★★★ /'raɪvəlri/ *n.*

competition or fighting between people, businesses, or organizations who are in the same area or want the same things 竞争

**far-flung** ☆ /fɑ:'flʌŋ/ *adj.*

used to refer to places that are a great distance away, or sth. that is spread over a very large area 遥远的

## Phrases and Expressions

**surprise attack** 奇袭

**lighter-than-air aircraft** 轻于空气的航空器

**heavier-than-air aircraft** 重于空气的航空器

**embark for...** 出发去(某地)

**air superiority** 空中优势

**stake sb's claim to...** 公开宣布对(某物)拥有所有权

**cantilever wing** 悬臂翼

**subject sb. to sth.** 使某人遭受某事物

## Reading Comprehension

**1** Read the text to get the main idea of each paragraph, and then match paragraphs 3–9 with the headings listed below.

- A The application of heavier-than-air aircraft in war
- B The initial design ideas of aircraft
- C The development of passenger transportation after the collapse of the military market
- D The emergence and employment of radar
- E The use of lighter-than-air aircraft in war
- F The emergence of new aviation companies
- G The changing roles of aircraft in war and the advancement of aircraft technology
- H The prototype of the man-carrying flight
- I Poor conditions on the early passenger aircraft
- J International cooperation in developing commercial aviation

- 1 Paragraph 3 \_\_\_\_\_
- 2 Paragraph 4 \_\_\_\_\_
- 3 Paragraph 5 \_\_\_\_\_
- 4 Paragraph 6 \_\_\_\_\_
- 5 Paragraph 7 \_\_\_\_\_
- 6 Paragraph 8 \_\_\_\_\_
- 7 Paragraph 9 \_\_\_\_\_

**2** Read the text closely and decide whether the following statements are true (T) or false (F).

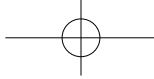
- 1 Both Roger Bacon and Leonardo da Vinci believed that humans could fly by the flapping of wings.
- 2 The first man-carrying lighter-than-air flying machine was used in war only.
- 3 The first military aircraft was purchased by the US Army Signal Corps from the Wright brothers.

- 4 DH-4 aircraft were equipped with fixed, synchronized, forward-firing machine guns by Fokker.
- 5 Radar technology was applied in the civil aviation system to track, identify and direct aircraft after WWII.
- 6 Conditions on the first daily international scheduled flight were so spartan that passengers in enclosed cabins had to wear protective clothing against the freezing cold.
- 7 At the early stage of civil aviation, flight remained uncomfortable, expensive and unreliable, but it soon proved to be profitable.
- 8 Some entrepreneurs, though they did not have much money, were able to provide passenger services because they had experienced pilots and surplus aircraft.

**3** Choose the best answer to each of the following questions.

- 1 The author introduces the “flying machine” at the beginning of the text to \_\_\_\_\_.
  - A. prove that people already dreamed of making a machine that could fly centuries ago
  - B. show that Roger Bacon and Leonardo da Vinci already invented machines that could fly
  - C. manifest that human beings can fly with the flapping of wings
  - D. illustrate the importance of flying to people
- 2 Which of the following was NOT the role the man-carrying lighter-than-air flying machine played in the 18th century?
  - A. Delivering passengers.
  - B. Anti-submarine patrols.
  - C. Delivering mail.
  - D. Observing the enemy.





Unit 1 How Was Aviation Developed?

- 3 How were the Italian aviators treated after they returned from the war between Italy and Turkey?
- They were admired by the Italian troops, but opposed by the common people.
  - They were highly treated by the Italian government, but did not enjoy high social status.
  - They were regarded as heroes by Italian patriots although they faced little opposition in the war.
  - They received a large bonus from the government.
- 4 According to the text, what gave the British an advantage during WWII?
- Small broadcasting beacons.
  - Advanced aircraft.
  - Powerful armies.
  - Multi-cavity magnetrons.
- 5 Which of the following is NOT true about the early passenger flight services?
- The cabin experience, because of the noise and turbulence, was not good.
  - The passenger flight was unprofitable and no airplane could carry enough passengers to cover costs.
  - Aircraft had a speed advantage and linked European cities.
  - Passengers might be subjected to extreme temperature, like stifling heat or freezing cold.
- 6 Which of the following is NOT the reason why many European countries kept on developing commercial aviation after the collapse of the military market?
- To maintain their national prestige.
  - To get prepared for possible future wars.
  - To boost the aviation industry.
  - To find a means to bind together their remote empires.

### Language Focus

- 1 Fill in the blanks with the words given below. Change the form where necessary. Each word can be used only once.

aviation	airworthy	airship
reconnaissance	lighter-than-air	monoplane
beacon	embark	heavier-than-air

- The event is dedicated to the recognition of excellence in the preservation and restoration of vintage aircraft in \_\_\_\_\_ condition.
- Aviation surged ahead in France and in 1909 Louis Blériot and his small \_\_\_\_\_ crossed the English Channel—the first airplane flight across the Channel.
- Within a decade of that first flight, balloons were used for military \_\_\_\_\_ in France.
- Similar technology is used to track down lost aircraft and yachts through their radio \_\_\_\_\_.
- The civil \_\_\_\_\_ industry has been the focus of particular controversy in the context of global climate change debates.
- In January 1943, he \_\_\_\_\_ for England, having gained his flying badge as an airman pilot the previous November.
- They emerged from obscurity and made history with, as historians of aviation carefully phrase it, the first power-driven \_\_\_\_\_ machine in which humans made free, controlled and sustained flight.
- Balloons, like \_\_\_\_\_, get their lift from a structure containing a gas that is less dense than the air surrounding the balloon.
- Balloons and airships are \_\_\_\_\_ aircraft, and fly because they are buoyant, which is to say that the total weight of the aircraft is less than the weight of the air it displaces.

- 2 Identify at least five expressions that contain the word “use” or have the meaning of “use” from the section “Instruments of the wars” in the text. Then fill in the blanks with the expressions on the list you have created.**

**Expressions:**

be used to \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**Fill in the blanks with the expressions on your list.**

- 1 By conversation we can \_\_\_\_\_ practice what we have studied in grammar.
- 2 The government is about to \_\_\_\_\_ drones equipped with a surveillance system to get the live images of physical movements across the entire town.
- 3 Mitchel noticed that academic theories had limited \_\_\_\_\_, and he was struck by the futility of most personality science.
- 4 Nearly everything they study at school has some practical \_\_\_\_\_ in their life, but is that the only reason why they go to school?
- 5 The Defense Department has been writing a policy for all of the military on \_\_\_\_\_ social networking sites.

- 3 Translate the following sentences into Chinese.**

- 1 Myth and folklore were rich in tales of airworthy vehicles that might carry the weight of a human, from various chariots of the gods to witches’ broomsticks.
- 2 With the advancement in technology in the early 20th century, heavier-than-air aircraft gradually replaced the lighter-than-air vehicles and soon found their first practical use in war.

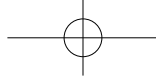
- 3 Of course, this new technology had civilian applications and would become the backbone of the civil aviation systems that developed after the end of WWII.
- 4 Conditions on European passenger lines soon became less spartan, yet even in enclosed cabins passengers were subjected to deafening noise, sickening turbulence, bone-shaking vibration and either stifling heat or freezing cold.
- 5 The ready availability of ex-military pilots and cheap war-surplus airplanes also encouraged adventurous entrepreneurs to try establishing passenger services run on shoestring budgets.

**Sharpening Writing Skills**

**Structure Analyzing and Summary Writing**

Expository essays are often organized in one of the three ways: spatial order, chronological order and logical order. But more frequently, an expository essay is composed of two or even three organizational patterns. Take this text as an example. The author applies not only the chronological order but also the logical order (cause and effect) to introduce the history of aviation and the relationship between wars and aviation development. As a result, the structure of this text cannot simply be presented in a linear way. Instead, a mind map would be a better way to display the complete structure.

A mind map, similar to a multilayered list, is a type of diagramming or mapping that places a central idea or concept at the center of the diagram and then adds associated ideas based on the main idea. The associated ideas might be in the form of words, phrases or even images.



Unit 1 How Was Aviation Developed?

**Step 1**

Fill in the blanks with no more than three words to develop a clearer understanding of the chronological and logical order of the text.

Phase	Time	Event or cause	Effect
Instruments to fly (original idea of airplanes)	In the 13th century	Roger Bacon picked up the idea of a 1) _____.	
	During the 2) _____ period	Leonardo da Vinci sketched many flying machines (including a screw-like propeller) in his notebooks.	The propeller was slightly similar to that of a helicopter.
Instruments of the wars	In 1783	A 3) _____ was invented by the Montgolfier brothers.	The flying machine was used for delivering 4) _____, and was also put into war.
	In 1794	The French used the hot-air balloon to observe the enemy during the Battle of Fleurus.	
	In the 19th century	The use of 5) _____ in warfare became prevalent.	
	In the early 20th century	The 6) _____ gradually replaced the lighter-than-air vehicles.	
	During and after WWI	Technology developed rapidly.	The role filled by aircraft changed from 7) _____ to artillery spotting, air superiority, bombing, ground attacks and anti-submarine patrols.
		Aircraft were produced massively.	Aircraft became sleeker, faster, more powerful and better armed.
	Before and during WWII	Radar and 9) _____ were invented and used in war.	New 8) _____ emerged and had to find other means of support.
Instruments of the passengers	10) _____	Passenger flights remained uncomfortable, expensive, unreliable and unprofitable.	
		The 11) _____ collapsed.	The European aircraft manufacturers found another use for aircraft, and they turned to 12) _____.

**Step 2**

Work with your partner and draw a mind map of your own to show the evolution of aviation. Then write a summary on the basis of your map.

**Tip:**

A **summary** is a shortened version of a text which contains the main points of the text and is written in Your Own Words.

- You should simply report back what the author said, without making your value judgments;
- In the first sentence of the summary, you are expected to identify the title, the author, as well as the author's thesis;
- You should add proper transitions where necessary to ensure coherence.

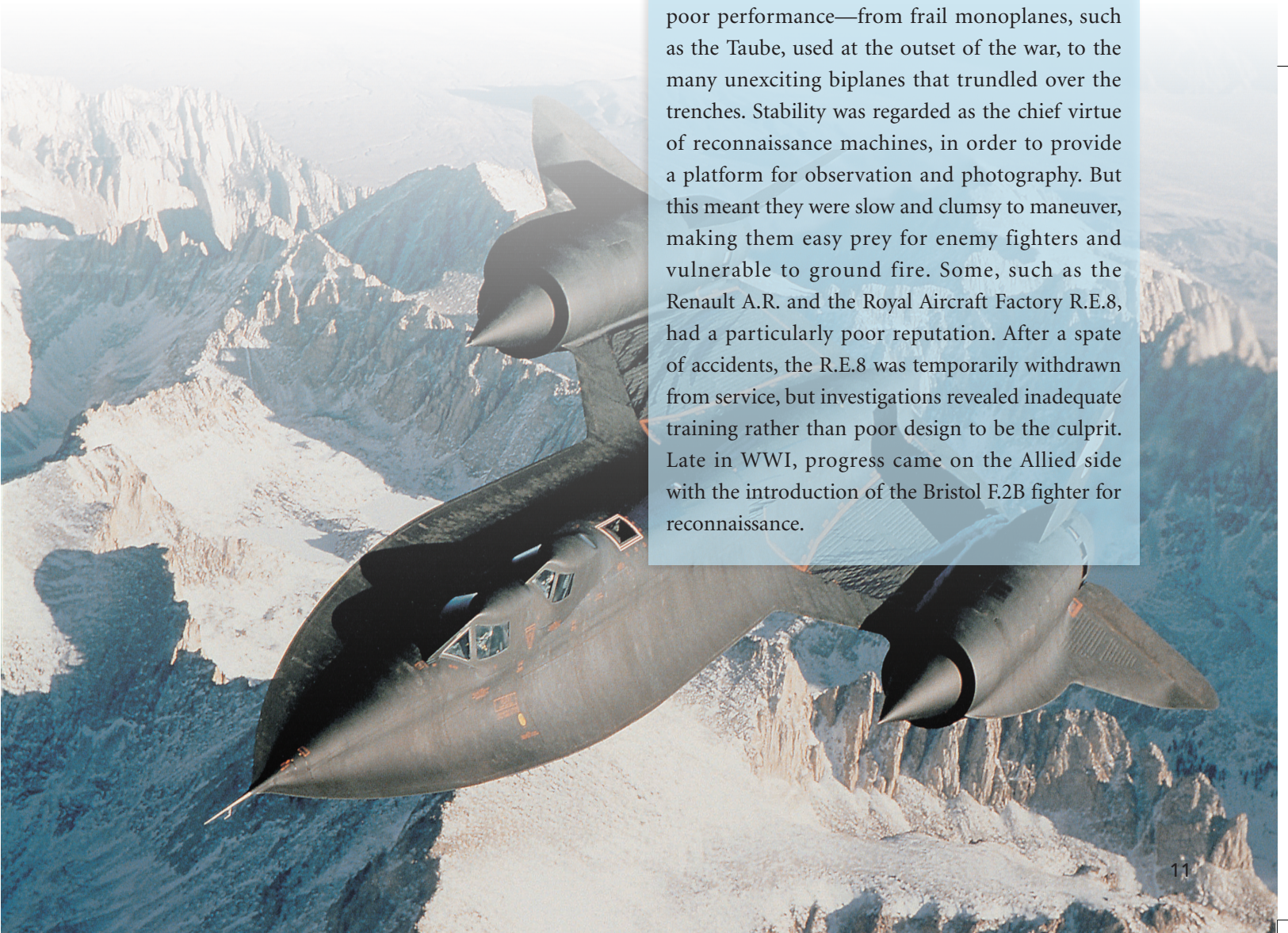
**Critical Thinking**

Read the following material and then discuss the questions with your partner.

- 1 How do you understand the German General Staff's statement that "the duty of the aviator is to see, not fight"?
- 2 How did war accelerate the development of the aviation industry?

**WW I Reconnaissance Aircraft**

At the start of World War One, a German General Staff stated that "the duty of the aviator is to see, not fight." Given that reconnaissance and artillery spotting were seen as the central purpose of military aviation, it is perhaps surprising that the aircraft dedicated to this role often had such poor performance—from frail monoplanes, such as the Taube, used at the outset of the war, to the many unexciting biplanes that trundled over the trenches. Stability was regarded as the chief virtue of reconnaissance machines, in order to provide a platform for observation and photography. But this meant they were slow and clumsy to maneuver, making them easy prey for enemy fighters and vulnerable to ground fire. Some, such as the Renault A.R. and the Royal Aircraft Factory R.E.8, had a particularly poor reputation. After a spate of accidents, the R.E.8 was temporarily withdrawn from service, but investigations revealed inadequate training rather than poor design to be the culprit. Late in WWI, progress came on the Allied side with the introduction of the Bristol F.2B fighter for reconnaissance.

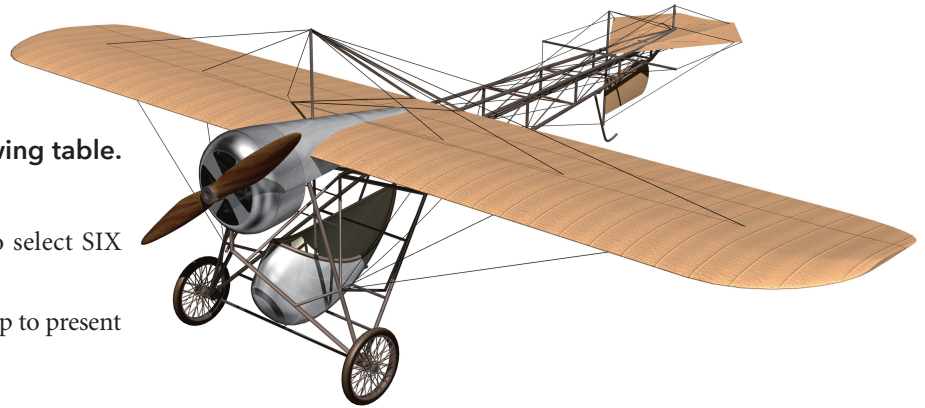


## Section B

### Listening and Speaking

**1** Work in groups and study the following table. Then

- discuss with your group members to select SIX most important firsts from the list;
- choose a representative from your group to present your result in class.



### Firsts in Aviation

Year	Event	People/Place/Aircraft involved
1903	First manned, powered heavier-than-air flight	Wilbur and Orville Wright
1906	First officially observed, powered European flight	Alberto Santos-Dumont
1908	First airplane passenger fatality	Thomas Selfridge
1909	First cross-channel flight	Louis Blériot
	First international aviation competition	Reims, France
1910	First licensed woman pilot	Raymonde de Laroche
	First aviation conference	Paris, France
1913	First multi-engine aircraft	Igor Sikorsky
1914	First aerial combat	Longwy, France
1919	First nonstop transatlantic flight	John Alcock & Arthur Brown
1924	First round-the-world flight	A team of US aviators
1927	First solo, nonstop transatlantic flight	Charles A. Lindbergh
1931	First nonstop flight across the Pacific Ocean	Clyde Pangborn & Hugh Herndon Jr.
1932	First woman to fly across the Atlantic Ocean	Amelia Earhart
1933	First round-the-world solo flight	Wiley Post
1939	First turbojet flight	He 178
1947	First supersonic flight	Chuck Yeager

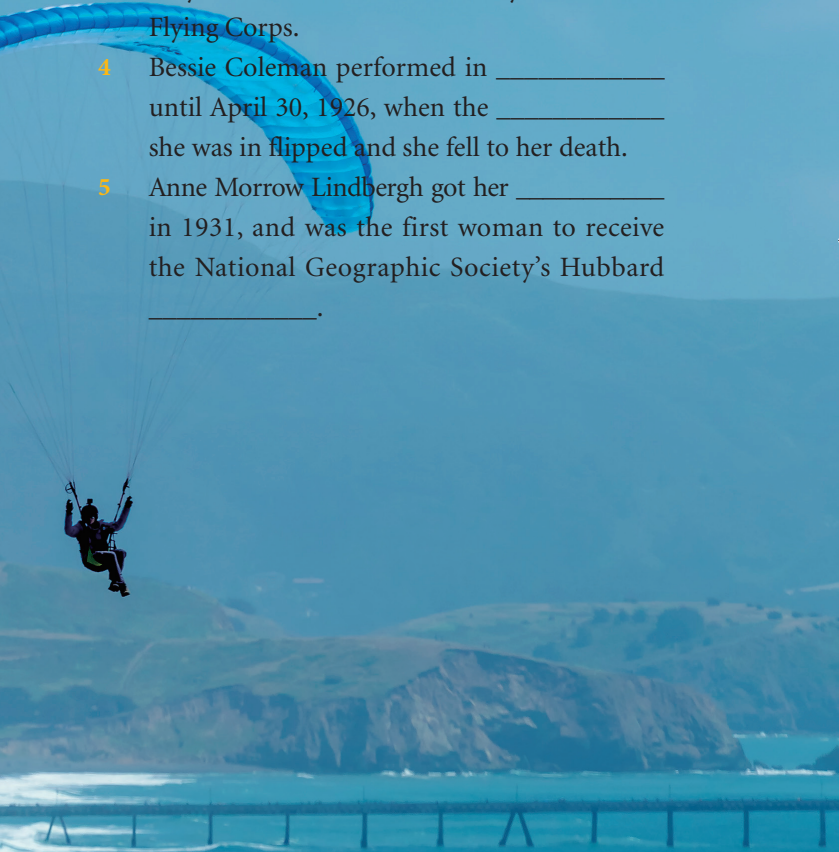
**2** Listen to an audio clip about significant women of the 20th century in aviation and match Column A with Column B.

**Word Bank**  
 make a solo flight; obstetrics; gynecology; flip over; cadet; airmail route; draftsman

A	B
<b>Bessica Raiche</b>	1 She was the first American woman to gain a pilot's license. 2 She eventually became a draftsman for the US Navy's Aeronautical Division.
<b>Harriet Quimby</b>	3 She was the first African-American woman to hold an international pilot's license. 4 She was greatly honored and her image was on a 32-cent stamp.
<b>Marjorie Stinson/ Katherine Stinson</b>	5 She was later more famous in the field of medicine. 6 She was the first woman in the US to earn a glider pilot's license.
<b>Bessie Coleman</b>	7 She once piloted alone across the English Channel. 8 She was the writer of <i>Listen! The Wind</i> and <i>Bring Me a Unicorn</i> .
<b>Anne Morrow Lindbergh</b>	9 She earned a gold medal as America's first woman aviator. 10 She flew airmail routes for the US government and did exhibition flying.

**3** Listen to the audio clip again and fill in the blanks with appropriate words or expressions.

- Bessica Raiche made a \_\_\_\_\_ in a Wright-type plane of bamboo and silk that she and her husband built in their \_\_\_\_\_.
- On July 1, 1912, Harriet Quimby was flying in the Third Annual Boston Aviation Meet with event organizer William Willard when their plane \_\_\_\_\_ and ejected both of them, causing them to \_\_\_\_\_ to their deaths.
- Sisters Marjorie and Katherine Stinson taught at a \_\_\_\_\_ in San Antonio, Texas, where they trained cadets for the Royal Canadian Flying Corps.
- Bessie Coleman performed in \_\_\_\_\_ until April 30, 1926, when the \_\_\_\_\_ she was in flipped and she fell to her death.
- Anne Morrow Lindbergh got her \_\_\_\_\_ in 1931, and was the first woman to receive the National Geographic Society's Hubbard \_\_\_\_\_.



## Reading

# Aviation Pioneers

The danger? But danger is one of the attractions of flight.

—Jean Conneau, French aviator

1 To make an idea move from invention to innovation, often from isolated developments in diverse fields, by combining different technologies, needs pioneers. And aviation had more than its share of larger-than-life characters. In 1783, Jean-François Pilâtre de Rozier and François Laurent le Vieux d'Arlandes flew over Paris with a manned lighter-than-air flight for about 25 minutes while the residents of the city watched and wondered. However, simply floating with the wind was not enough; more ideas and pioneers were needed to transform the flying dream of humans into a great innovation.

## The flying man—Otto Lilienthal

2 Born in Anklam, Pomerania Province, German, in 1848, Otto Lilienthal was fascinated from an early age by bird flight. Although he trained as an engineer and ran a factory building steam engines, he remained convinced that ornithology held the key to human flight—a belief reflected in the title of his 1889 publication, *Birdflight as the Basis of Aviation*. Although he became famous for his experiments with what would now be called hang gliders, flying his first one in 1891, he never abandoned the idea of flapping wings as a means of propulsion. In his systematic work on wing shapes, Lilienthal showed a genuinely scientific temperament, but he also possessed a streak of showmanship that helped publicize the pursuit of human flight. He was also a man of great

physical courage who had a huge impact on the development of flight. Repeated flying experiments involved an astonishing level of risk, so Lilienthal devised a shock absorber to protect him if he crashed, but only used it fitfully. On

August 9, 1896,

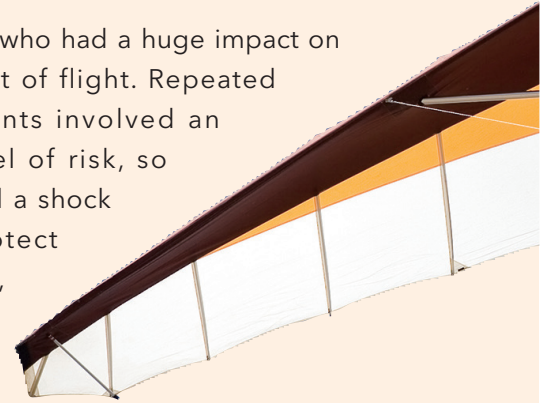
his glider stalled and crashed during a flight. He died of his injuries the following day.

3 By then, Lilienthal was a famous man. Photographs of him in flight had sparked a great deal of public interest, and his most successful glider, the No. 11 standard monoplane, had been sold to a number of enthusiasts, making it the first aircraft to be produced in quantity.

## Inventors of the first manned, powered heavier-than-air craft—the Wright brothers

4 The first breakthrough of the Wright brothers in flying machine experiments came from a more traditional direction—watching soaring buzzards. They were struck by the movement of the feathers on their wingtips, which kept the birds' lateral balance, and puzzled for a long time over achieving a similar effect on an aircraft wing, until Wilbur Wright had a sudden moment of inspiration. Absent-mindedly twisting the ends of a narrow cardboard box in opposite directions, he saw that the same could be done with a wing. "Wing warping" was thus devised.

5 One of the Wrights' objectives in those experiments was to achieve controlled banked turns using the wing-warping mechanism, but those experiments carried out in the 1901 flights led to a side-slipping crash in which Wilbur was injured. The brothers struggled to understand why their turns would not work, eventually deciding that the wing warping was creating drag effects that upset the machine's aerodynamics. Instead of giving up, they continued their experiments





throughout  
the following two years.

6 December 17, 1903 was the fateful day that Orville Wright became the first person to pilot a powered heavier-than-air craft. He remained aloft for 12 seconds and covered a distance of only 120 feet (over 36 meters), but this single event would change the way people around the world viewed the sky; they made the first controlled, sustained flight of a powered, heavier-than-air aircraft. During the three years after the historic flight, the Wright brothers worked to improve the reliability, range and maneuverability of their design. By 1908, the Wright brothers were working under a contract with the US Army to build aircraft for the Army.

#### First person to fly across the English Channel—Louis Blériot

- 7 Louis Blériot was an engineer and skilled businessman who made his fortune in the automobile accessories business before turning his attention to flight. At the age of 28, he began his lifelong dedication to aviation by designing a flapping machine. By 1906, he was one of the most prominent French aeronautical experimenters, but his early aircraft designs were ungainly failures. Although almost bankrupted by the expense of his experiments, he achieved a breakthrough in 1907 with the Blériot VII, a monoplane that flew over 500 meters, and set the basic configuration for his Channel-hopping Blériot XI.
- 8 To win the competition of being the first to cross the English Channel by airplane, Blériot—who was suffering from a severely burned foot doused with hot oil from his engine during a recent flight—woke very early on July 25, 1909 and got prepared to cross the Channel. Though

he was well prepared for the cold, his navigational preparations were far less meticulous. Visibility was poor, yet he had no compass. At 4:41 a.m., Blériot rose into the air and flew off into the mist. While flying toward the coast of England, Blériot had some hairy moments because of the gusting winds and his once loss of direction. Nevertheless, he managed to arrive at the other side of the Channel. The landing was not an elegant one—he had broken the propeller and smashed his undercarriage—but it was enough to enter the history books. The Blériot XI monoplane in which Louis Blériot made his historic crossing of the English Channel established the main monoplane design features for generations to come and paved the way for Blériot company's considerable commercial success.

- 9 The illusion of being able to fly like a bird or a bat had captured the imagination of people for generations. The achievements made by those early pioneers were not only combining different technologies to make flying faster and longer, but also preserving the belief that flight is possible to man.

### Culture Notes

#### 1 *Birdflight as the Basis of Aviation*

《鸟类飞行：航空的基础》出版于1889年，作者奥托·李林塔尔（Otto Lilienthal）。这本书根据奥托·李林塔尔和古斯塔夫·李林塔尔（Gustav Lilienthal）兄弟的多次飞行实验和多年研究经验编写而成，开创性地将飞行和空气动力特性联系起来，被后人认为是航空科学的基础著作。

#### 2 *wing warping*

翘曲机翼是莱特兄弟发明的一种用于控制固定翼飞机滚转运动的系统。借助这个系统，飞行员可通过操纵滑轮和钢线扭转机翼，从而改变两侧升力。两翼的升力差会产生滚转力矩，帮助飞机保持平直飞行或转弯。



## New Words

**pioneer** ★★★★★ /ˈpaɪəˈniə/ *n.*

sb. who is important in the early development of sth., and whose work or ideas are later developed by other people 先驱

**manned** <术语> /mænd/ *adj.*

carrying or operated by one or more persons 由人驾驶的, 由人操纵的

**publication** ★★★★★ /ˌpʌblɪˈkeɪʃən/ *n.*

book, magazine, etc. that has been published 出版物

**glider** <术语> /ˈɡlaɪdər/ *n.*

a light plane that flies without an engine 滑翔机

**propulsion** <术语> /prəˈpʌlʃən/ *n.*

the force that drives sth. forward 推进力

**temperament** ★ /ˈtempərəmənt/ *n.*

a person's nature as shown in the way they behave or react to situations or people 性情, 禀性

**streak** ★ /stri:k/ *n.*

a part of sb.'s character that is different from the rest of their character 个性特点

**publicize** ★ /ˈpʌblɪsaɪz/ *v.*

to make sth. known to the public 宣传

**stall** <术语> /stɔ:l/ *v.*

(of an aircraft) to get out of control and start to drop because of loss of speed (飞行器) (因失速) 失控下降

**breakthrough** ★★★★★ /ˈbreɪkθru:/ *n.*

a discovery or an achievement after a lot of hard work 重大发现, 突破

**lateral** <术语> /ˈlætərəl/ *adj.*

connected with the side of sth. or with movement to the side 侧面的, 横向的

**twist** ★★ /twɪst/ *v.*

to bend or turn sth. 扭, 拧

**cardboard** ★★ /ˈkɑ:dbɔ:d/ *n.*

stiff material like very thick paper, often used for making boxes 硬纸板, 卡纸

**bank** <术语> /bæŋk/ *v.*

(of an aircraft) to fly with one wing higher than the other when turning 倾斜飞行

**aerodynamics** <术语> /ˌeərəʊdaɪˈnæmɪks/ *n.*

the qualities of an object that affect the way it moves through the air 空气动力特性

**fateful** ☆ /ˈfeɪtʃəl/ *adj.*

having momentous significance or consequences 有重大影响的

**aloft** ☆ /əˈlɒft/ *adv.*

in the air or off the ground 在空中

**historic** ★★★★★ /hɪˈstɔ:ɪk/ *adj.*

important in history, or likely to be considered important at some time in the future 有历史意义的

**maneuverability** <术语> /məˌnu:vərəˈbɪləti/ *n.*

the quality of being maneuverable 可操作性

**accessory** ★★ /əkˈsesəri/ *n.*

an extra piece of equipment that is useful but not essential 配件

**prominent** ★★★★★ /ˈprɒmɪnənt/ *adj.*

important or well known 重要的, 著名的

**aeronautical** <术语> /ˌeərəˈnɔ:tɪkl/ *adj.*

relating to the science or practice of building or flying aircraft 航空学的

**configuration** ★ /kənˌfɪɡəˈreɪʃən/ *n.*

the shape or arrangement of the parts of sth. 构造

**douse** ☆ /daʊs/ *v.*

to wet thoroughly 使湿透, 浸湿

**meticulous** ★★ /mɪˈtɪkjələs/ *adj.*

paying careful attention to every detail 细心的, 注意细节的

**visibility** ★★ /ˌvɪzəˈbɪləti/ *n.*

how far or how clearly you can see in particular weather conditions 能见度

**compass** ★ /ˈkʌmpəs/ *n.*

an instrument for finding direction, with a needle that always points to the north 罗盘, 指南针

**undercarriage** <术语> /ˈʌndəˌkærɪdʒ/ *n.*

the part of an aircraft, including the wheels, that supports it when it is landing and taking off (飞行器的) 起落架

**illusion** ★★ /ɪˈlu:ʒən/ *n.*

a false idea or belief 幻想

**preserve** ★★★★★ /prɪˈzɜ:v/ *v.*

if you preserve a situation or condition, you make sure that it remains as it is, and does not change or end 保持

### Phrases and Expressions

**have more than sb.'s share of** 有相当多的（问题、成功、冒险经历等）

**larger-than-life character** 充满传奇色彩的人物

**shock absorber** 减震器

**in quantity** 大量地

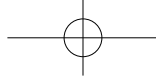
**make sb.'s fortune** 发财

**capture sb.'s imagination** 吸引某人

### Reading Comprehension

**1** Complete the table about the three pioneers. Write no more than four words for each blank.

Pioneer	Achievement	Sacrifice or injury
Otto Lilienthal	<ul style="list-style-type: none"> <li>● Famous for his experiments with 1) _____;</li> <li>● Stuck to the idea of 2) _____ as a means of propulsion;</li> <li>● Devised a 3) _____ to protect him if he crashed;</li> <li>● The 4) _____ became the first aircraft to be produced in quantity.</li> </ul>	His glider stalled and crashed, and he died of his injuries the next day.
The Wright brothers	<ul style="list-style-type: none"> <li>● Devised 5) _____ after Wilbur Wright twisted the ends of a cardboard box;</li> <li>● Orville Wright became the first person to pilot a powered 6) _____ craft;</li> <li>● Improved the 7) _____ of their design during the three years after the flight.</li> </ul>	Wilbur was injured in a 8) _____ in 1901.
Louis Blériot	<ul style="list-style-type: none"> <li>● Accumulated his wealth in the 9) _____ business;</li> <li>● Began to dedicate himself to aviation by designing a 10) _____;</li> <li>● Made a breakthrough in 1907 with a 11) _____, the Blériot VII;</li> <li>● Became the first to 12) _____ by airplane;</li> <li>● Invented the Blériot XI and established the main 13) _____ for generations to come.</li> </ul>	Broke the 14) _____ and smashed the 15) _____ while landing at the other side of the English Channel.



**2 Read the text closely and decide whether the following statements are true (T) or false (F).**

- 1 The book *Birdflight as the Basis of Aviation* was the reflection of Otto Lilienthal's belief that ornithology was the key to human flight.
- 2 Otto Lilienthal devised a shock absorber to protect him if he crashed, and it worked so well that it was soon sold to a number of enthusiasts.
- 3 The No. 11 standard monoplane, designed by the Wright brothers, was the first aircraft to be produced in quantity.
- 4 Wing warping was inspired by Wilbur Wright's twisting of the ends of a box.
- 5 The wing-warping mechanism proved to be a good way to control the banked turns of an aircraft.
- 6 Orville Wright's flying on December 17, 1903 signified that the first heavier-than-air craft had been invented.
- 7 Blériot's foot was doused with hot oil from his engine when he was crossing the English Channel.
- 8 The Blériot XI biplane established the plane design features for later generations.

**3 Answer the following questions.**

- 1 Aviation pioneers, not satisfied with the lighter-than-air craft, made enormous sacrifices to invent the heavier-than-air craft. What are the reasons for their continuous adventure and innovation?
- 2 What is your understanding of aviation pioneers? Why could people like Otto Lilienthal, the Wright brothers and Louis Blériot be regarded as aviation pioneers?
- 3 How do you understand the last sentence of the text—"The achievements made by those early pioneers were not only combining different technologies to make flying faster and longer, but also preserving the belief that flight is possible to man."?

**Language Focus**

- 1 Identify three flying machines mentioned in the text. Describe one of them to your partner and ask your partner to find the machine that matches your description.

Flying machines:

Your description:

- 2 Fill in the blanks with the words given below. Change the form where necessary. Each word can be used only once.

pioneer	manned	glider
propulsion	stall	bank
undercarriage	aloft	aeronautical

- 1 It is logical to assume that understanding the solar system environment is just as important to the vision as building the next generation of \_\_\_\_\_ spacecraft.
- 2 The pilot raised the \_\_\_\_\_ and the aircraft skidded to a halt.
- 3 Kitesurfing involves riding a small board over water while gaining \_\_\_\_\_ from the wind by means of a large kite.
- 4 The aircraft rolls a bit to the left and he compensates by adding some right aileron to hold the 30-degree \_\_\_\_\_ angle.
- 5 At a strictly mathematical level, engineers know how to design planes that will stay \_\_\_\_\_.
- 6 He went on to study \_\_\_\_\_ engineering at the Air Force Academy.
- 7 As an international \_\_\_\_\_ in the aerospace sector, this company designs, manufactures and delivers industry-leading commercial aircraft, helicopters, etc.
- 8 She took part in a week-long tour which included both tandem and solo jumps, and trips in \_\_\_\_\_ and sightseeing aircraft.
- 9 If it has an altitude-hold feature, it may cause the airplane to \_\_\_\_\_ by pitching the nose up to maintain your selected altitude.

**3 Paraphrase the following sentences.**

- 1 Aviation had more than its share of larger-than-life characters.
- 2 Although he trained as an engineer and ran a factory building steam engines, he remained convinced that ornithology held the key to human flight.
- 3 He remained aloft for 12 seconds and covered a distance of only 120 feet (over 36 meters).
- 4 During the three years after the historic flight, the Wright brothers worked to improve the reliability, range and maneuverability of their design.
- 5 Louis Blériot was an engineer and skilled businessman who made his fortune in the automobile accessories business before turning his attention to flight.
- 6 Though he was well prepared for the cold, his navigational preparations were far less meticulous.
- 7 The landing was not an elegant one—he had broken the propeller and smashed his undercarriage—but it was enough to enter the history books.

**4 Translate the following passage into English.**

冯如1884年出生于广东恩平，12岁时漂洋过海到美国谋生。1903年，当得知莱特兄弟自制的载人动力飞机试飞成功后，他决心要依靠自己的力量来制造飞机。冯如得到当地华侨的资助，于1908年在旧金山东部的奥克兰建立飞机制造厂。1909年9月21日，冯如驾驶“冯如1号”飞机在奥克兰附近的一个圆形山丘旁进行了第一次试飞。飞机顺利起飞并平稳飞行，但飞行800米后，螺旋桨突然断裂，飞机触地受损，幸运的是冯如没有受伤。

**Sharpening Writing Skills****Biography**

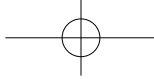
A biography is a written account of the series of events that make up a person's life. Every biography will include some basic details. The most important thing in writing a biography is to gather biographical details and facts, which may include:

- date and place of birth and death;
- family information;
- lifetime accomplishments;
- major events of life.

While these details and facts are necessary to your biography, they are not enough to make a good biography. You should state your view on the person in your biography and then support your view with evidence. To be specific, you should consider the following questions before you start.

- What is your view on the person in your biography?
- What are the details/What is the evidence that support(s) your view?
- How do you present your biography—in chronological order, by major life events, or others?





Unit 1 How Was Aviation Developed?

The text is a biography of three aviation pioneers. Fill in the table to develop a clearer understanding of the key elements included in a biography.

Name	Otto Lilienthal
Who is the person?	
Are these details included in the biography?	<p>1 Date and place of birth and death; Yes <input type="checkbox"/> No <input type="checkbox"/></p> <p>2 Family information; Yes <input type="checkbox"/> No <input type="checkbox"/></p> <p>3 Lifetime accomplishments; Yes <input type="checkbox"/> No <input type="checkbox"/></p> <p>4 Major events of life. Yes <input type="checkbox"/> No <input type="checkbox"/></p> <p>If yes, what are they? _____</p> <p>5 Other biographical details: _____</p>
View & evidence	<p>1 What is/are the author's view(s) about Otto Lilienthal? _____</p> <p>2 What are the supporting details? _____</p>

### Critical Thinking

Discuss the questions with your partner.

1 Amelia Earhart, American aviator, was the first woman to fly solo across the Atlantic Ocean. She once said, "Women, like men, should try to do the

impossible. And when they fail, their failure should be a challenge to others." Do you think women can do extraordinary things even better than men? And why?



## Section C

### Unit Project

## Chinese Aviation Pioneers

### Step 1

Find detailed information on at least three Chinese aviation pioneers from the Internet or books. The sources of information should be noted. The information may include but not be limited to:

- his/her personal information;
- his/her contribution(s) to China's aviation industry.

### Step 2

Work in groups and summarize the information you have gathered with your group members.

### Step 3

Imitate the structure of the text in Section B and write a biography of those Chinese aviation pioneers with your group members. Then present your group's biography in class to be evaluated by other groups. The final essay should include both the summarized information in Step 2 and your judgments on them.

## Section D

### Supplementary Reading

## A Special Case

- 1 The aviation industry has long been treated as a special case in international business, subject to different rules and held to different standards. In fact, international aviation has been a serious problem in international relations, affecting the way governments view one another, the way individual citizens view their own and foreign countries, and in a variety of direct and indirect connections the security arrangements by which we live. There are several reasons for the special status and serious problems associated with international aviation. Originally, the most compelling argument was national defense. Under programs such as the US Civil Reserve Air Fleet (CRAF) plan, civilian fleets could be used during times of military action to ferry troops and supplies. It was, therefore, vital to insure the existence and health of this civilian reserve. In the case of CRAF, the US government gets a reserve fleet for times of emergency without the cost of maintaining it and the airlines get paid a rate that during the Middle East conflict, Desert Storm, was 1.75 times the seat mile or cargo mile rate. National defense has also been cited as the reason for insisting on home country ownership of these airlines and the aerospace manufacturers that supply their airframes, engines and other parts. The premise of the argument is the notion that home country nationals would or could be made to cooperate in the defense of their country. As we will see, the connection between civilian and military technology at the manufacturing level has always been close; the innovations in technology first deployed and tested on military aircraft were quickly applied to the commercial fleet. In a number of countries such as the US, funding for research and development for these "military"





## Unit 1 How Was Aviation Developed?

innovations came from the government and went to firms who also had sizeable civilian operations, a situation that has led foreign competitors to charge “unfair subsidy.”

2 The second most cited reason for special treatment has been the economic impact of aviation. The Air Transport Action Group estimates that air transport supported 3.5% of global gross domestic product (GDP), provided 56.6 million jobs, and had a global economic impact of US\$2.2 trillion. Passenger traffic grew on average 6% per year during the decade of the 1980s and early 1990s driven by a number of factors: falling real costs of air travel, increasing economic activity, intensifying international trade, increasing disposable incomes, political stability, relaxation of travel restrictions, expanding ethnic ties, increasing leisure time, tourism promotion, air transport liberalization, and growth in emerging regions and countries. Historically, air transport has grown at about twice the rate of GDP and during the period of 1960–1990, 80% of traffic growth could be explained by growth in GDP. Beginning in the 1990s, falling real prices (fares) played a greater role in traffic growth. As air travel grows, the direct (value of airline and on-airport activities) and indirect (value of off-airport activities of passengers and shippers) economic impact grows as well. In addition, there is an induced impact from the successive spending of recipients of these direct and indirect benefits. In short, the economic impact of the air transport industry makes its health a major concern of governments, businesses and passengers around the world and keeps it from being seen as “just another industry.” Unfortunately, this historic link between economic growth and air transport has decoupled in the US and appears to be decoupling in the EU as well. It is not yet clear what this change represents. It is possible that the industry in the US and EU has finally reached the stage of maturity that has permanently decoupled this link. It is also possible that consumers have found other ways to spend their discretionary dollars. The phenomenon may be temporary or it may be time to acknowledge that

there are limits to all phenomena, and nothing including aviation continues upward forever. Still, there is no denying that air transport contributes in many ways to national and global economies.

3 The third reason for aviation’s special status is the link that exists in the minds of many between aviation and national achievement and pride. International airlines “carry the flag” around the world. This reason should not be underestimated as a driver of individual and government perception. When the bankruptcy and subsequent grounding of the Swissair fleet forced the Swiss football team to fly the Russian carrier, Aeroflot, to a qualifying match in Moscow, one article reported this event as a “further humiliation for the Swiss flag carrier.” The uproar that occurred in the UK over the replacement of the Union Jack on the tail of many British Airways planes by the so-called ethnic tails intended to show British Airways as the airline of the world was motivated by similar nationalistic sentiment. Likewise, the debate in Belgium over the bankruptcy of Sabena and the need for a national carrier to serve the interest of the people of Belgium has more to do with nationalistic pride than airline economics. Most recently, the Italian efforts to save their national carrier, Alitalia, can be linked to the same national pride that has motivated so many other governments. At the manufacturing level, nations have also mourned the loss of their aviation pioneers. One of the key arguments for the European formation of Airbus was the dominance of manufacturing by US firms. The Airbus project was seen by the French as a “Grand Project: one of those brilliant combinations of technological skill and political will, serving to remind the French themselves—and everybody else—just what a great nation they are.” To the Germans, Airbus was the chance to rebuild an aerospace industry that had contributed many early innovations in aviation. In short, all things about aviation’s technological achievement and visionary leadership have been linked to national pride.

## Culture Notes

### 1 Civil Reserve Air Fleet (CRAF)

美国民用后备机队。民用后备机队是美国机动资源的一部分。当军用飞机无法满足军事行动的空运需求时，美国军事部门会选择与其合作的民用航空公司，由其提供运输服务。

### 2 unfair subsidy

不公平补贴。当某国的民航业陷入困境时，该国政府可能会对民航公司进行补贴。这会导致该国航空公司在国际航空市场上的不公平竞争，引起其他国家未得到补贴的航空公司的不满。

### 3 Air Transport Action Group

航空运输行动小组。由航空运输业组织机构和公司组成的国际性、非营利性联盟，在全球有40多个成员，包括空客（Airbus）、波音（Boeing）、庞巴迪（Bombardier）、通用（GE）、国际航空运输协会（IATA）等。行动小组致力于推动航空业的可持续发展。

## Thinking after Reading

Answer the following questions.

- 1 What might be the purpose of having a reserve air fleet for a country? What are the roles of the CRAF in the US from the aspect of politics and economy?
- 2 What is the relationship between civilian technology and military technology in the aviation industry?
- 3 An intriguing idea proposed by the author is that “the economic impact of the air transport industry... keeps it from being seen as ‘just another industry.’” How do you understand that?

## Section E

### Learning Assessment

Achievement	Yes	No
I can understand the early history of aviation.		
I can explain the roles of war in aviation development.		
I have known some aviation heroes and their achievements.		
I can draw a mind map and write a summary on the basis of it.		
I can write a biography by providing basic information and my views on the person.		

