V. AIR SAFETY AND SECURITY

Unit V.1. Air Safety

Text 1.

Read and translate the following text into Ukrainian.

Air safety is a term encompassing the theory, investigation and categorization of flight failures, and the prevention of such failures through regulation, education and training. It can also be applied in the context of campaigns that inform the public as to the safety of air travel.

During the 1920s, the first laws were passed in the USA to regulate civil aviation. Of particular significance was the Air Commerce Act 1926, which required pilots and aircraft to be examined and licensed, for accidents to be properly investigated, and for the establishment of safety rules and navigation aids, under the Aeronautics Branch of the Department of Commerce.

Despite this, in 1926 and 1927 there were a total of 24 fatal commercial airline crashes, a further 16 in 1928, and 51 in 1929 (killing 61 people), which remains the worst year on record at an accident rate of about 1 for every 1,000,000 miles (1,600,000 km) flown. Based on the current numbers flying, this would equate to 7,000 fatal incidents per year.

The fatal incident rate has declined steadily ever since, and, since 1997 the number of fatal air accidents has been no more than 1 for every 2,000,000,000 person-miles flown (e.g., 100 people flying a plane for 1,000 miles (1,600 km) counts as 100,000 person-miles, making it comparable with methods of transportation with different numbers of passengers, such as one person driving a car for 100,000 miles (160,000 km), which is also 100,000 person-miles), making it one of the safest modes of transportation, as measured by distance travelled.

A disproportionate number of all U.S. aircraft crashes occur in Alaska, largely as a result of severe weather conditions. Between 1990-2006 there were 1441 commuter and air taxi crashes in the U.S. of which 373 (26%) were fatal, resulting in 1063 deaths (142 occupational pilot deaths). Alaska accounted for 513 (36%) of the total U.S. crashes.

Another aspect of safety is protection from attack currently known as Security (as the ISO definition of safety encompasses non-intentional (safety_safety) and intentional (safety_security) causes of harm or property damage). The terrorist attacks of 2001 are not counted as accidents. However, even if they were counted as accidents they would have added only about 2 deaths per 2,000,000,000 person-miles. Only 2 months later, American Airlines Flight 587 crashed in Queens, NY, killing 256 people, including 5 on the ground, causing 2001 to show a very high fatality rate. Even so, the rate that year including the attacks (estimated here to be about 4 deaths per 1,000,000,000 person-miles), is safe compared to some other forms of transport, if measured by distance travelled.

Safety improvements have resulted from improved aircraft design, engineering and maintenance, the evolution of navigation aids, and safety protocols and procedures.

It is often reported that air travel is the safest in terms of deaths per passenger mile. The National Transportation Safety Board (2006) reports 1.3 deaths per hundred million vehicle miles for travel by car, and 1.7 deaths per hundred million vehicle miles for travel by air. These are not passenger miles. If an airplane has 100 passengers, then the passenger miles are 100 times higher, making the risk 100 times lower. The number of deaths per passenger mile on commercial airlines between 1995 and 2000 is about 3 deaths per 10 billion passenger miles. One of the first navigation aids to be introduced (in the USA in the late 1920s) was airfield lighting to assist pilots to make landings in poor weather or after dark. The Precision Approach Path Indicator was developed from this in the 1930s, indicating to the pilot the angle of descent to the airfield. This later became adopted internationally through the standards of the International Civil Aviation Organization (ICAO).

In 1929 Jimmy Doolittle developed instrument flight.

With the spread of radio technology, several experimental radio based navigation aids were developed from the late 1920s onwards. These were most successfully used in conjunction with instruments in the cockpit in the form of Instrument landing systems (ILS), first used by a scheduled flight to make a landing in a snowstorm at Pittsburgh in 1938. A form of ILS was adopted by the ICAO for international use in 1949.

Following the development of radar in World War II, it was deployed as a landing aid for civil aviation in the form of Ground-controlled approach (GCA) systems, joined in 1948 by distance measuring equipment (DME), and in the 1950s by airport surveillance radar as an aid to air traffic control. VHF omnidirectional range (VOR) stations became the predominate means of route navigation during the 1960s, superseding the low frequency radio ranges and the Non-directional beacon (NDB). The ground based VOR stations were often co-located with DME transmitters and then labelled as VOR-DME stations on navigation charts. VOR-TAC stations, which combined VOR and TACAN features (military TACtical Air Navigation) — the latter including both a DME distance feature and a separate TACAN azimuth feature, which provides military pilots data similar to the civilian VOR, were also used in that new system. With the proper receiving equipment in the aircraft, pilots could know their radials in degrees to/from the VOR station, as well as the slant range distance to/from, if the station was co-located with DME or TACAN.

All of the ground-based navigation aids are being supplemented by satellite-based aids like Global Positioning System (GPS), which make it possible for aircrews to know their position with great precision anywhere in the world. With the arrival of Wide Area Augmentation System (WAAS), GPS navigation has become accurate enough for vertical (altitude) as well as horizontal use, and is being used increasingly for instrument approaches as well as en-route navigation. However, since the GPS constellation is a single point of failure that can be switched off by the U.S. military in time of crisis, on-board Inertial Navigation System (INS) or ground-based navigation aids are still required for backup.

Some major safety devices now required in commercial aircraft involve:

- Evacuation slides – aid rapid passenger exit from an aircraft in an emergency situation.
- Advanced avionics – computerized auto-recovery and alert systems.
- Turbine engines – durability and failure containment improvements
- Landing gear – that can be lowered even after loss of power and hydraulics.

When measured on a passenger-distance calculation, air travel is the safest form of transportation available: these figures are the ones mentioned by the air industry when quoting statistics on air safety. A typical statement is this one by the BBC: "UK airline operations are among the safest anywhere. When compared against all other modes of transport on a fatality per mile basis air transport is the safest – six times safer than travelling by car and twice as safe as rail."

However, when measured by fatalities per person transported, buses are the safest form of transportation and the number of air travel fatalities per person are surpassed only by bicycles and motorcycles. This statistic is the one used by the insurance industry when calculating insurance rates for air travel.

For every billion kilometres travelled, trains have a fatality rate 12 times larger than air travel, while automobiles have a fatality rate 62 times larger. On the other hand, for every billion journeys, buses are the safest form of transportation. By the last measure air transportation is three times more dangerous than car transportation and almost 30 times more dangerous than bus.

A 2007 study by Popular Mechanics found that passengers sitting at the back of a plane are 40% more likely to survive a crash than those sitting in the front, although this article also quotes Boeing, the FAA and a website on aircraft safety, all claiming that there is no safest seat. The article studied 20 crashes, not taking in account the developments in safety after those accidents. However, a flight data recorder is usually mounted in the aircraft's empennage (tail section), where it is more likely to survive a severe crash.

Over 95% of people in U.S. plane crashes between 1983 and 2000 survived.

From *Wiki*

Exercise 1. Transcribe the following words:

aviation, encompass, occur, severe, vehicle, descent, scheduled, surveillance, superseding, beacon, turbine, empennage.

Exercise 2. Answer the questions:

1. What is safety?
2. When was Air Commerce Act adopted?
3. What are the main safety devices required in commercial aircraft?
4. What does GPS stand for?
5. What does VOR stand for?
6. What does WAAS stand for?
7. What does INS stand for?
8. What is the safest mode of transport?
9. What does trains fatality rate mean?
10. What is automobiles fatality rate?
11. What did a 2007 Popular Mechanics study find?
12. What is the percentage of survivors in U.S. plane crashes between 1983 and 2000?

Exercise 3. Say whether the following statements are true or false. Correct false statements.

1. When measured on a passenger-distance calculation, air travel is the safest form of transportation available
2. The fatal incident rate has declined steadily ever since, and, since 1997 the number of fatal air accidents has been no more than 1 for every 2,000,000,000 person-miles flown.
3. All of the ground-based navigation aids are being supplemented by satellite-based aids like Global Positioning System (GPS), which make it possible for aircrews to know their position with great precision anywhere in the world.
4. GPS navigation is not accurate at all for vertical (altitude) as well as horizontal use, and is being used increasingly for instrument approaches as well as en-route navigation.
5. For every billion kilometres travelled, trains have a fatality rate 12 times larger than air travel, while automobiles have a fatality rate 62 times larger.
6. A flight data recorder is usually mounted in the aircraft's cockpit, where it is more likely to survive a severe crash.

Exercise 4. Choose the most appropriate translation if any. Explain your choice.

1. Air safety
a) авіа безпечність;
b) безпека польотів;
c) авіаційна безпека;
d) безпечна авіація.

2. Advanced avionics
a) просунута авіоніка;
b) новітня авіоніка;
c) сучасна авіоніка;
d) сучасне авіаційне електронне обладнання.

3. Passenger-distance calculation
a) розрахунок відстані на кількість пасажирів;
b) пасажиро-дистантні підрахунки;
c) розрахунок пасажировідстані;
d) розрахунок пасажирокілометрів.

4. Insurance rate
a) розмір страхової премії;
b) прискорення страхових виплат;
c) швидкість страхування;
d) виплата страховки.

5. Ground-based navigation aids
a) помічники наземного базування;
b) допомога у наземному обслуговуванні;
c) наземні навігаційні засоби;
d) допомога у наземній навігації.

6. *Flight data recorder*
a) записувач польотних даних;
b) реєстратор польотної інформації;
c) рекодер даних польоту;
d) журнал запису польотної інформації.

7. Instrument approach
a) інструментальне наближення;
b) наближення з використанням приладів;
c) захід на посадку по приладах;
d) посадка по приладах.

8. Fatality
a) доля;
b) нещасний випадок зі смертельним кінцем;
c) жертва;
d) нещасний випадок.

9. Global positioning system
a) глобальна система місцезнаходження;
b) система глобального знаходження;
c) глобальна позиційна система;
d) система знаходження місцеположення на глобусі.

10. Precision approach path indicator
a) вказівник траєкторії точного заходу на посадку;
b) показчик точного заходу на посадку по траєкторії;
c) траєкторія заходу на посадку з використанням вказівника;
d) вказівник точної траєкторії заходу на посадку.

Exercise 5. Paraphrase the following sentences.

1. During the 1920s, the first laws were passed in the USA to regulate civil aviation.
2. A disproportionate number of all U.S. aircraft crashes occur in Alaska, largely as a result of severe weather conditions.
3. One of the first navigation aids to be introduced (in the USA in the late 1920s) was airfield lighting to assist pilots to make landings in poor weather or after dark.
4. All of the ground-based navigation aids are being supplemented by satellite-based aids like Global Positioning System (GPS), which make it possible for aircrews to know their position with great precision anywhere in the world.

5. When measured by fatalities per person transported, buses are the safest form of transportation and the number of air travel fatalities per person are surpassed only by bicycles and motorcycles.

6. A 2007 study by Popular Mechanics found that passengers sitting at the back of a plane are 40% more likely to survive a crash than those sitting in the front.

7. A flight data recorder is usually mounted in the aircraft's empennage (tail section), where it is more likely to survive a severe crash.

8. Boeing, the FAA and a website on aircraft safety, all claiming that there is no safest seat.

9. For every billion kilometres travelled, trains have a fatality rate 12 times larger than air travel, while automobiles have a fatality rate 62 times larger.

10. When compared against all other modes of transport on a fatality per mile basis air transport is the safest.

Exercise 6. Finish the sentences:

1. Air safety *i*s a term encompassing …
2. A disproportionate number of all U.S. aircraft crashes occur in Alaska, largely as a result of …
3. The terrorist attacks of 2001 are not counted as …
4. In 1929 Jimmy Doolittle developed ...
5. Some major safety devices now required in commercial aircraft involve …
6. When measured on a passenger-distance calculation, air travel is …
7. A 2007 study by Popular Mechanics found that passengers sitting at the back of a plane are 40% more likely to survive a crash than those sitting ...
8. Over 95% of people in U.S. plane crashes between 1983 and 2000 ...
9. GPS navigation has become accurate enough for vertical (altitude) as well as horizontal use, and is being used increasingly for instrument approaches as well as …
10. (VOR) stations became the predominate means of route navigation during the 1960s, superseding …

Exercise 7. Write the correct form of the word in brackets and complete the sentences.

1. In 1926 and 1927 there were a total of 24 fatal (commerce) airline crashes.
2. (Safe) improvements have resulted from improved aircraft design, engineering and maintenance, the evolution of navigation aids, and safety protocols and procedures.
3. A (disproportion) number of all U.S. aircraft crashes occur in Alaska, largely as a result of severe weather conditions.
4. UK airline operations are among the (safe) anywhere.
5. For every billion kilometres (travel), trains have a fatality rate 12 times larger than air travel, while automobiles have a fatality rate 62 times larger.
6. When (measure) on a passenger-distance calculation, air travel is the safest form of transportation available.

Exercise 8. Fill in the correct abbreviation (from the box below).

DME, NDB, INS, VOR-DME, WAAS, GPS, VOR

1. _____ makes it possible for aircrews to know their position with great precision anywhere in the world.
2. With the arrival of _____, GPS navigation has become accurate enough for vertical (altitude) as well as horizontal use, and is being used increasingly for instrument approaches as well as en-route navigation.
3. However, since the GPS constellation is a single point of failure that can be switched off by the U.S. military in time of crisis, on-board _____ or ground-based navigation aids are still required for backup.
4. _____ stations became the predominate means of route navigation during the 1960s, superseding the low frequency radio ranges and the _____.
5. The ground based VOR stations were often co-located with _____ transmitters and then labelled as _____ stations on navigation charts.

Exercise 9. What grammatical form is used in these sentences? Offer your variants of translations.

1. All of the ground-based navigation aids *are being supplemented* by satellite-based aids like Global Positioning System.
2. *When measured* on a passenger-distance calculation, air travel is the safest form of transportation available.
3. With the arrival of WAAS, GPS navigation *has become* accurate enough for vertical (altitude) as well as horizontal use, and is being used increasingly for instrument approaches as well as en-route navigation.
4. Even *if they were counted* as accidents they *would have added* only about 2 deaths per 2,000,000,000 person-miles.
5. *It is often reported* that air travel is the safest in terms of deaths per passenger mile.

Exercise 10. Translate the text below into English.

Проблема безпеки польотів й особливості структури й змісту теоретичних дисциплін розглядалися Міжнародною організацією цивільної авіації.

Міністерству цивільної авіації була дана вказівка всім льотним навчальним закладам про необхідність підвищення ефективності теоретичної підготовки курсантів льотних навчальних закладів. Цим документом пропонувалося всім льотним навчальним закладам забороняти допуск до реального льотного навчання курсантів, що мають оцінку нижче 4 балів.

На фоні значної масштабності організації й психолого-педагогічних умов підвищення ефективності спеціальної теоретичної підготовки в 1982 році було ухвалене рішення про створення у всіх льотних навчальних закладах (незалежно від кваліфікаційного рівня) кафедр безпеки польотів, які акумулювали й інтегрували б різні і у той же час важливі для безпеки польотів дисципліни.

From *http://www.lib.ua-ru.net/*

Exercise 11. Presentation.

Find in the Internet the news about air safety. Prepare a short news summary and be ready to present it in the class. Remember that you should not read your summary but present it to the audience. Make cards if you cannot remember some important dates or words. Write out the words you think your fellow students do not know on the blackboard and explain. One of the students will translate your speech, so speak distinctly and correctly. Make sure you know how to pronounce all the words from your piece of news.

Text 2.

Read and translate the following text.

Organisations concerned with aviation safety

Geneva-based Aircraft Crashes Record Office (ACRO) compiles statistics on aviation accidents of aircraft capable of carrying more than six passengers, not including helicopters, balloons, or fighter airplanes. The ACRO announced that the year 2007 was the safest year in aviation since 1963 in terms of number of accidents. There had been 136 accidents registered (compared to 164 in 2006), resulting in a total of 965 deaths (compared to 1,293 in 2006). 2004 was the year with the lowest number of fatalities since the end of World War II, with 771 deaths. The year with most fatalities was 1972, with 3,214 deaths.

The European Aviation Safety Agency (EASA) is tasked by Article 15(4) of Regulation (EC) No 216/2008 of the European Parliament and of the Council of 20 February 2008 to provide a review of aviation safety on an annual basis. The Annual Safety Review presents statistics on European and worldwide civil aviation safety. The statistics are grouped according to type of operation, for instance commercial air transport, and aircraft category, such as aeroplanes, helicopters, gliders etc. The Agency had access to accident and statistical information collected by the International Civil Aviation Organisation (ICAO). States are required, according to ICAO Annex 13 on Aircraft Accident and Incident Investigation, to report to ICAO information on accidents and serious incidents to aircraft with a maximum certificated take-off mass (MTOM) over 2250 kg. Therefore, most statistics in this review concern aircraft above this mass. In addition to the ICAO data, a request was made to the EASA Member States to obtain light aircraft accident data. Furthermore, data on the operation of aircraft for commercial air transport was obtained from both ICAO and the NLR Air Transport Safety Institute.

National organizations involved in accident investigation: The Australian Transport Safety Bureau is the federal government body responsible for investigating transport-related accidents and incidents within Australia. It covers air, sea, and rail travel. It is an agency of the Department of Infrastructure, Transport, Regional Development and Local Government. The Transportation Safety Board of Canada (TSB/BST), an independent agency which reports directly to Parliament, is the Canadian agency responsible for the advancement of transportation safety through the investigation and reporting upon accident and incident occurrences in all prevalent Canadian modes of transportation — marine, air, rail and pipeline. In France, the agency responsible for investigation of civilian air crashes is the Bureau d'Enquêtes et d'Analyses pour la Sécurité de l'Aviation Civile (BEA). Its purpose is to establish the circumstances and causes of the accident and to make recommendations for their future avoidance. In Germany, the agency for investigating air crashes is the Federal Bureau of Aircraft Accidents Investigation (BFU). It is an agency of the Federal Ministry of Transport, Building and Urban Development. The Interstate Aviation Committee (MAK) is an executive body overseeing the use and management of civil aviation in the Commonwealth of Independent States. This Organization investigating air accident in the former USSR area by Air Accident Investigation Commission of the Interstate Aviation Committee. In the United States, most civil aviation incidents are investigated by the National Transportation Safety Board (NTSB). When investigating an aviation disaster, NTSB investigators piece together evidence from the crash and determine the likely cause or causes. The NTSB will also investigate incidents which occur overseas in collaboration with local investigation authorities where the crash has involved a US-registered aircraft, where there has been significant loss of American lives, or when the type of aircraft involved is built by an American company. In the United Kingdom, the agency responsible for investigation of civilian air crashes is the Air Accidents Investigation Branch (AAIB) of the Department for Transport. Its purpose is to establish the circumstances and causes of the accident and to make recommendations for their future avoidance.

From *Wiki*

Exercise 1. Using a monolingual dictionary of aviation or encyclopaedia, please, find the definitions of the following words and word combinations.

Executive body, pipeline transportation, mode of transportation, federal government body, transport-related accidents and incidents, worldwide civil aviation safety.

Exercise 2. Answer the questions:

1. What aviation safety body compiles statistics on aviation accidents of aircraft capable of carrying more than six passengers, not including helicopters, balloons, or fighter airplanes?

2. What year was announced the safest by the ACRO?

3. What is the main task of the European Aviation Safety Agency (EASA)?

4. What does the Annual Safety Review represent?

5. Who is required, according to ICAO Annex 13 on Aircraft Accident and Incident Investigation, to report to ICAO information on accidents and serious incidents to aircraft with a maximum certificated take-off mass (MTOM) over 2,250 kg?

6. What national organizations involved in accident investigation do you know? Name their functions.

Exercise 3. Say whether the following statements are true or false. Correct false statements.

1. The statistics are grouped according to type of operation, for instance commercial air transport, and aircraft category, such as aeroplanes, helicopters, gliders etc.
2. The ACRO announced that the year 2005 was the safest year in aviation since 1963 in terms of number of accidents.
3. States are not required, according to ICAO Annex 13 on Aircraft Accident and Incident Investigation, to report to ICAO information on accidents and serious incidents to aircraft with a maximum certificated take-off mass (MTOM) over 2250 kg.
4. The Interstate Aviation Committee (MAK) is an executive body overseeing the use and management of civil aviation in the Commonwealth of Independent States.
5. In the United States, most civil aviation incidents are investigated by ICAO.
6. In the United Kingdom, the agency responsible for investigation of civilian air crashes is the Air Accidents Investigation Branch (AAIB) of the Department for Transport.

Exercise 4. Paraphrase the following sentences.

1. Geneva-based Aircraft Crashes Record Office (ACRO) compiles statistics on aviation accidents of aircraft capable of carrying more than six passengers, not including helicopters, balloons, or fighter airplanes.
2. The European Aviation Safety Agency (EASA) is tasked by Article 15(4) of Regulation (EC) No 216/2008 of the European Parliament and of the Council of 20 February 2008 to provide a review of aviation safety on an annual basis.
3. In France, the agency responsible for investigation of civilian air crashes is the Bureau d'Enquêtes et d'Analyses pour la Sécurité de l'Aviation Civile (BEA).
4. When investigating an aviation disaster, NTSB investigators piece together evidence from the crash and determine the likely cause or causes.
5. Its purpose is to establish the circumstances and causes of the accident and to make recommendations for their future avoidance.

Exercise 5. Finish the sentences.

1. There had been 136 accidents registered (compared to 164 in 2006), resulting in a total of ...
2. The European Aviation Safety Agency (EASA) is tasked by Article 15(4) of Regulation (EC) No 216/2008 of the European Parliament and of the Council of 20 February 2008 to provide a review of ...
3. The statistics are grouped according to ...
4. The Agency had access to accident and statistical information collected by ...
5. States are required, according to ICAO Annex 13 on Aircraft Accident and Incident Investigation, to report to ICAO information on ...
6. The Australian Transport Safety Bureau is the federal government body responsible for ...
7. In Germany, the agency for investigating air crashes is ...
8. The Interstate Aviation Committee (MAK) is an executive body overseeing the use and management of civil aviation in ...
9. In the United States, most civil aviation incidents are investigated by ...
10. In the United Kingdom, the agency responsible for investigation of civilian air crashes is ...

Exercise 6. Write the correct form of the word in brackets and complete the sentences.

1. The European Aviation Safety Agency is (task) to provide a review of aviation safety on an annual basis.
2. The statistics are (group) according to type of operation.
3. The Australian Transport Safety Bureau is the federal government body responsible for investigating transport-(relate) accidents and incidents within Australia.
4. Geneva-(base) Aircraft Crashes Record Office compiles statistics on aviation accidents of aircraft.
5. The ACRO announced that the year 2007 was the (safe) year in aviation since 1963 in terms of number of accidents.

Text 3.

Read and translate the following text.

Ground Damage

Aircraft are occasionally damaged by ground equipment at the airport. In the act of servicing the aircraft between flights a great deal of ground equipment must operate in close proximity to the fuselage and wings. Occasionally the aircraft gets bumped or worse.

Damage may be in the form of simple scratches in the paint or small dents in the skin. However, because aircraft structures (including the outer skin) play such a critical role in the safe operation of a flight, all damage is inspected, measured and possibly tested to ensure that any damage is within safe tolerances. A dent that may look no worse than common "parking lot damage" to an automobile can be serious enough to ground an airplane until a repair can be made.

An example of the seriousness of this problem was the December 26, 2005 de-pressurization incident on Alaska Airlines flight 536. During ground services a baggage handler hit the side of the aircraft with a tug towing a train of baggage carts. This damaged the metal skin of the aircraft. This damage was not reported and the plane departed. Climbing through 26,000 feet (7,900 metres) the damaged section of the skin gave way due to the growing difference in pressure between the inside of the aircraft and the outside air. The cabin depressurized with a bang, frightening all aboard and necessitating a rapid descent back to denser (breathable) air and an emergency landing. Postlanding examination of the fuselage revealed a 12 in × 6 in (30 cm × 15 cm) hole between the middle and forward cargo doors on the right side of the airplane.

The three pieces of ground equipment that most frequently damage aircraft are the passenger boarding bridge, catering trucks, and cargo "beltloaders." However, any other equipment found on an airport ramp can damage an aircraft through careless use, high winds, mechanical failure, and so on.

The generic industry colloquial term for this damage is "ramp rash", or "hangar rash".

Exercise 1. Answer the questions:

1. What damage can aircraft suffer on the ground?
2. Why do they measure, inspect and test all the damage?
3. What happened on Alaska Airlines flight 536?
4. What are the three pieces of ground equipment that most frequently damage aircraft?
5. What is the generic industry colloquial term for this damage?

Exercise 2. Say whether the following statements are true or false. Correct false statements.

1. Damage may be in the form of simple scratches in the paint or small dents in the skin.
2. Because aircraft structures (including the outer skin) play such a critical role in the safe operation of a flight, all damage is inspected, measured and possibly tested to ensure that any damage is within safe tolerances.
3. A dent that may look no worse than common "parking lot damage" to an automobile cannot be serious enough to ground an airplane until a repair can be made.
4. The three pieces of ground equipment that most frequently damage aircraft are the passenger boarding bridge, foodstuffs, and cargo "beltloaders."
5. The generic industry colloquial term for this damage is "ramp rash", or "hangar rash".

Exercise 3. Paraphrase the following sentences.

1. Aircraft are occasionally damaged by ground equipment at the airport.
2. Damage may be in the form of simple scratches in the paint or small dents in the skin.
3. In the act of servicing the aircraft between flights a great deal of ground equipment must operate in close proximity to the fuselage and wings.
4. An example of the seriousness of this problem was the December 26, 2005 de-pressurization incident on Alaska Airlines flight 536.
5. The cabin depressurized with a bang, frightening all aboard and necessitating a rapid descent back to denser (breathable) air and an emergency landing.

Exercise 4. Finish the sentences.

1. Damage may be in the form of ...
2. Because aircraft structures (including the outer skin) play such a critical role in the safe operation of a flight, all damage is inspected, measured and possibly tested to ensure that ...
3. An example of the seriousness of this problem was the December 26, 2005 de-pressurization incident on ...
4. The cabin depressurized with a bang, frightening all aboard and necessitating a rapid descent back to ...
5. The three pieces of ground equipment that most frequently damage aircraft are ...

Exercise 5. Make up sentences of your own using the following terms:

baggage cart, cabin depressurization, passenger bridge, catering cart, cart beltloader

Unit 2. Aviation Safety

Factors influencing aviation safety

A pilot might fly the plane in an accident-prone manner when misinformed by a printed document (manual, map etc.), by reacting to a faulty instrument or indicator (either in cockpit or on ground) or by following inaccurate

instructions or information from flight or ground control. Lack of information by the control tower, or delayed instructions, are major factors contributing to accidents.

Boeing studies have shown that airliners are struck by lightning on average of twice per year. While the "flash and bang" is startling to the passengers and crew, aircraft are able to withstand normal lightning strikes.

The dangers of more powerful positive lightning were not understood until the destruction of a glider in 1999. It has since been suggested that positive lightning may have caused the crash of Pan Am Flight 214 in 1963. At that time aircraft were not designed to withstand such strikes, since their existence was unknown at the time standards were set. The 1985 standard in force at the time of the glider crash, Advisory Circular AC 20-53A, was replaced by Advisory Circular AC 20-53B in 2006, however it is unclear whether adequate protection against positive lighting was incorporated.

The effects of normal lightning on traditional metal-covered aircraft are well understood and serious damage from a lightning strike on an airplane is rare. However, as more and more aircraft, like the upcoming Boeing 787, whose whole exterior is made of non-conducting composite materials take to the skies, additional design effort and testing must be made before certification authorities will permit these aircraft in commercial service.

Snowy and icy conditions are frequent contributors to airline accidents. The December 8, 2005 accident where Southwest Airlines Flight 1248 slid off the end of the runway in heavy snow conditions is just one of many examples. Just as on a road, ice and snow buildup can make braking and steering difficult or impossible.

The icing of wings is another problem and measures have been developed to combat it. Even a small amount of ice or coarse frost can greatly decrease the ability of a wing to develop lift. This could prevent an aircraft from taking off. If ice builds up during flight the result can be catastrophic as evidenced by the crash of American Eagle Flight 4184 (an ATR 72 aircraft) near Roselawn, Indiana on October 31, 1994, killing 68, or Air Florida Flight 90.

Airlines and airports ensure that aircraft are properly de-iced before take-off whenever the weather threatens to create icing conditions. Modern airliners are designed to prevent ice buildup on wings, engines, and tails (empennage) by either routing heated air from jet engines through the leading edges of the wing, tail, and inlets, or on slower aircraft, by use of inflatable rubber "boots" that expand and break off any accumulated ice.

Finally, airline dispatch offices keep watch on weather along the routes of their flights, helping the pilots avoid the worst of in-flight icing conditions. Pilots can also be equipped with an ice detector in order to leave icy areas they have flown into.

Although aircraft are now designed to fly even after the failure of one or more aircraft engines, the failure of the second engine on one side for example is obviously serious. Losing all engine power is even more serious, as illustrated by the 1970 Dominicana DC-9 air disaster, when fuel contamination caused the failure of both engines. To have an emergency landing site is then very important.

In the 1983 Gimli Glider incident, an Air Canada flight suffered fuel exhaustion during cruise flight, forcing the pilot to glide the plane to an emergency dead-stick landing. The automatic deployment of the ram air turbine maintained the necessary hydraulic pressure to the flight controls, so that the pilot was able to land with only a minimal amount of damage to the plane, and minor (evacuation) injuries to a few passengers.

The ultimate form of engine failure, physical separation, occurred in 1979 when a complete engine detached from American Airlines Flight 191, causing damage to the aircraft and loss of control.

Metal fatigue has caused failure either of the engine or of the aircraft body.

Examples: (1) the January 8, 1989 Kegworth air disaster; (2) De Havilland Comets accidents in 1953 and 1954; (3) Aloha Airlines Flight 243 in 1988.

Now that the subject is better understood, rigorous inspection and non-destructive testing procedures are in place.

Composite materials consist of layers of fibres embedded in a resin matrix. In some cases, especially when subjected to cyclic stress, the fibres may tear off the matrix, the layers of the material then separate from each other – a process called delamination, and form a mica-like structure which then falls apart. As the failure develops inside the material, nothing is shown on the surface; instrument methods (often ultrasound-based) have to be used to detect such a material failure.

Aircraft have developed delamination problems, but most were discovered before they caused a catastrophic failure. Delamination risk is as old as composite material. Even in the 1940s, several Yakovlev Yak-9s experienced delamination of plywood in their construction.

Stalling an aircraft (increasing the angle of attack to a point at which the wings fail to produce enough lift), can be dangerous and can result in a crash unless the pilot reacts in the proper manner. Upon entering a stall, the pilot will need an adequate altitude buffer to regain control, reduce the angle of attack to a point where the boundary layer reattaches to the wing, and airspeed is brought up to where level flight can resume. Stalls are most dangerous at low altitudes, which occur during takeoff and landing.

Devices have been developed to warn the pilot when the plane's speed is coming close to the stall speed. These include stall warning horns (now standard on virtually all powered aircraft), stick shakers and voice warnings. Most stalls are a result of the pilot allowing the plane to go too slow for the particular weight and configuration at the time. However, because flow separation (stall) is purely a function of angle of attack, most aircraft can be pushed hard

enough to cause a stall even at high speeds (those that can't simply lack the control authority to change the angle of attack enough at speed to induce a stall).

Safety regulations control aircraft materials and the requirements for automated fire safety systems. Usually these requirements take the form of required tests. The tests measure flammability and the toxicity of smoke. When the tests fail, they fail on a prototype in an engineering laboratory, rather than in an aircraft.

Fire on board the aircraft, and more especially the toxic smoke generated, have been the cause of accidents. An electrical fire on Air Canada Flight 797 in 1983 caused the deaths of 23 of the 46 passengers, resulting in the introduction of floor level lighting to assist people to evacuate a smoke-filled aircraft. Two years later a fire on the runway caused the loss of 55 lives, 48 from the effects of incapacitating and subsequently lethal toxic gas and smoke, in the 1985 British Airtours Flight 28M. That accident raised serious concerns relating to survivability, something that prior to 1985 had not been studied in such detail. The swift incursion of the fire into the fuselage and the layout of the aircraft impaired passengers' ability to evacuate, with areas such as the forward galley area becoming a bottle-neck for escaping passengers, with some dying very close to the exits. A large amount of research into evacuation and cabin and seating layouts was carried at Cranfield Institute to try to measure what makes a good evacuation route, which led to the seat layout by overwing exits being changed by mandate and the examination of evacuation requirements relating to the design of galley areas. The use of smoke hoods or misting systems were also examined although both were rejected.

The cargo holds of most airliners are equipped with "fire bottles" (essentially remote-controlled fire extinguishers) to combat a fire that might occur in the baggage holds, below the passenger cabin. In May 1996 ValuJet Airlines Flight 592 crashed into the Florida Everglades a few minutes after takeoff after a fire broke out in the forward cargo hold. All 110 aboard were killed.

At one time fire fighting foam paths were laid down before an emergency landing, but the practice was considered only marginally effective, and concerns about the depletion of fire fighting capability due to pre-foaming led the United States FAA to withdraw its recommendation in 1987.

Bird strike is an aviation term for a collision between a bird and an aircraft. It is a common threat to aircraft safety and has caused a number of fatal accidents. In 1988 an Ethiopian Airlines Boeing 737 sucked pigeons into both engines during take-off and then crashed in an attempt to return to the Bahir Dar airport; of the 104 people aboard, 35 died and 21 were injured. In another incident in 1995, a Dassault Falcon 20 crashed at a Paris airport during an emergency landing attempt after sucking lapwings into an engine, which caused an engine failure and a fire in the airplane fuselage; all 10 people on board were killed. Canada Geese were ingested into the engines of US Airways 1549 causing the engines to fail on the Airbus A320 that crash landed onto the Hudson River.

Modern jet engines have the capability of surviving an ingestion of a bird. Small fast planes, such as military jet fighters, are at higher risk than heavy multi-engine ones. This is due to the fact that the fan of a high-bypass turbofan engine, typical on transport aircraft, acts as a centrifugal separator to force ingested materials (birds, ice, etc.) to the outside of the fan's disc. As a result, such materials go through the relatively unobstructed bypass duct, rather than through the core of the engine, which contains the smaller and more delicate compressor blades. Military aircraft designed for high-speed flight typically have pure turbojet, or low-bypass turbofan engines, increasing the risk that ingested materials will get into the core of the engine to cause damage.

The highest risk of the bird strike is during the takeoff and landing, in low altitudes, which is in the vicinity of the airports. Some airports use active countermeasures, ranging from a person with a shotgun through recorded sounds of predators to employing falconers. Poisonous grass can be planted that is not palatable to birds, nor to insects that attract insectivorous birds. Passive countermeasures involve sensible land-use management, avoiding conditions attracting flocks of birds to the area (e.g. landfills). Another tactic found effective is to let the grass at the airfield grow taller (approximately 12 inches (30 centimetres)) as some species of birds won't land if they cannot see one another.

Bird strike can also break windshields and wound the pilot.

Exercise 1. Transcribe the following words and give them your own definitions. Check in the dictionary whether you are correct.

Accident-prone, inaccurate, non-conducting, catastrophic, coarse, boots, dispatch, ram, turbine, cyclic, ultrasound, altitude, buffer, flammability, incursion, centrifugal, turbofan, falconers, windshields, shotgun.

Exercise 2. Answer the following questions.

1. What are the main factors influencing the aviation safety?
2. How can the ice effect on airplane?
3. What is meant under the term “metal fatigue”?
4. What measures were taken to combat with fire that may occur on board?
5. What is bird strike?
6. When the possibility of a bird strike is the most likely to happen? Why?
7. What can cause a pilot to fly in an accident-prone manner?
8. What was the reason of the accident where Southwest Airlines crashed?
9. What are “fire bottles”?

10. What do the airports do to prevent bird strikes?

Exercise 3. Finish the following sentences.

1. The main reason of aircraft accidents are…
2. In 1999 the destruction of the glider became a ground to think that…
3. Before using of the aircraft in commercial service…
4. Current aircraft prevent the occurring of ice by…
5. Power loss if one or even more engines is not fatal but only in case if…
6. Most delamination problems were discovered…
7. Devices that warn the pilot when the plane's speed is coming close to the stall speed are…
8. Baggage holds are likely to set on fire but they are equipped…
9. Bird strike is a threat…
10. Due to the fact that the fan of a high-bypass turbofan engine, acts as a centrifugal separator small fast planes…
11. To active countermeasures against the bird refer…

Exercise 4. Match the word to the most appropriate translation.

1. *in an accident-prone manner*

a. небезпечним шляхом;
b. неправильним чином;
c. у небезпечних умовах;
d. у нещасній манері.

2. *positive lightning*

a. позитивна блискавка;
b. позитивно-заряджена блискавка;
c. правильне освітлення;
d. безперебійний спалах.

3. *traditional metal-covered aircraft*

a. традиційний метало вкритий літак;
b. літак зі звичайним металевим покриттям;
c. звичайний літак, вкритий металом;
d. класичне металеве покриття літака.

4. *icy conditions*

a. умови надзвичайного холоду;
b. льодисті обставини;
c. ожеледь;
d. байдужі умови.

Exercise 5. Match the words in column A with a word in column B in order to make an appropriate word-combinations.

A	B
1. accident-prone	1. horns
2. fuel	2. frost
3. in-flight	3. instructions
4. engineering	4. holds
5. coarse	5. stress
6. emergency	6. landing
7. warning	7. exhaustion
8. cyclic	8. manner
9. inaccurate	9. laboratory
10. cargo	10. icing conditions

Exercise 6. What grammatical forms are used in the following sentences. Comment on it and suggest the best ways of translation.

1. The Soviet Union's launching of Sputnik on October 4, 1957, was a pivotal event in the development of the American space program.

2. At the bottom of each page the visitor will find a navigation bar containing links to six essays that explain more about the Idea of Flight, the Wright Brothers, Aviation Pioneers, Modern Aviation, Air Power and Space.

3. Using places nominated by State, Federal and Tribal Historic Preservation Offices and listed in the National Register of Historic Places, the itineraries help potential visitors plan their next trip by highlighting the amazing diversity of this country's historic places and supplying accessibility information for each featured site.

4. Respecting security training, ICAO develops course material on a range of topics for use by civil aviation administrations and a network of regional security training centres.

5. Currently airports practice using passive and active ways to get rid of the birds on airport territories, some of them are useful in avoiding bird strikes.

Exercise 7. Translate into Ukrainian.

Bird strikes

A bird strike is a collision between an airborne animal (usually a bird or bat) and a man-made vehicle, especially aircraft. The term is also used for bird deaths resulting from collisions with man-made structures such as power lines, towers and wind turbines. A bug strike is an impairment of an aircraft or aviator by an airborne insect.

Bird strikes are a significant threat to flight safety, and have caused a number of accidents with human casualties. Major accidents involving civil aircraft are quite low and it has been estimated that there is only about one accident resulting in human death in one billion flying hours. The majority of bird strikes (65%) cause little damage to the aircraft; however, the collision is usually fatal to the bird.

Most accidents occur when the bird hits the windscreen or flies into the engines. These cause annual damages that have been estimated at $400 million within the United States of America alone and up to $1.2 billion to commercial aircraft worldwide.

From *Wiki*

Exercise 8. Have a look at the following text. It contains a number of mistakes and inaccuracies in translation. Act as a proofreader and rewrite the sentences according to the rules of style, grammar and word combinability.

Civil aviation safety council being formed.	Рада цивільної авіації з питань безпеки формується.
Following the decade's worst aviation tragedy in Mangalore last week that claimed 158 lives, the civil aviation ministry has fast-tracked the process for setting up a civil aviation safety council to be headed by air safety regulator.	Після найгіршого в історії авіації десятиліття трагедія в Мангалуру, яка трапилася минулого тижня, забрала 158 життів, Міністерство цивільної авіації прискорило процес створення громадської ради з безпеки польотів на чолі з керівництвом безпеки повітряного руху.
The 25-member council will draw representation from all stakeholders that includes airlines, pilot associations and air traffic control. It will also have special invitees such as aircraft manufacturers, US safety regulator Federal Aviation Administration, EU safety regulator, National Aviation Laboratory and Indian Space and Research Organisation, top government sources told The Indian Express. The council is likely to be set up in less than a month, with its first meeting to be chaired by civil aviation minister Praful Patel and civil aviation secretary M Nambiar.	25-член Ради залучить представників усіх зацікавлених сторін, що включає в себе авіакомпанії, організації пілотів та управління повітряним рухом. Крім того, на зустрічі будуть присутні спеціальні гості, як наприклад виробники літаків, служба держнагляду з техніки безпеки Федеральної авіаційної адміністрації США, служба держнагляду з техніки безпеки ЄС, Національного авіаційного лабораторії і Індійська організація досліджень, про це повідомиливищі урядові джерела The Indian Express. Рада, ймовірно, буде створена менш ніж за місяць, першу нараду очолить міністр цивільної авіації Прафул Патель і секретар цивільної авіації М Намбьяр.
The council is likely to hold its meeting quarterly to discuss aviation-related issues, draw lessons from aviation industry globally and recommend policy initiatives and measures to secure Indian aviation. "The council will submit its recommendations to the air safety regulator, Directorate General of Civil Aviation (DGCA) for its consideration," said the source. The council is likely to be headed by Nasim Zaidi. The ministry is likely to rope in eminent personalities like Madhavan Nair.	Рада може проводитиме свої засідання щоквартально з метою обговорення питання, пов'язані з авіацією, винесення уроків з авіаційної галузі на глобальному рівні і рекомендування політичних ініціатив та заходів щодо забезпечення безпеки індійської авіації. "Рада представлятиме свої рекомендації керівництву безпеки повітряного руху, Генеральному директорату цивільної авіації (ГУЦА) розгляду ", сказало джерело. Раду, швидше за все, очолить Назім Заїді. Міністерства, ймовірно, залучить до роботи видатних діячів, як Мадхаван Наїр.

Exercise 9. Underline the correct word or word combinations in the following sentences.

1. Lack of information by the (inaccurate instructions | control tower), or delayed instructions, are major factors contributing to accidents.
2. The dangers of more powerful (positive lightning | faulty instrument) were not understood until the destruction of a glider in 1999.
3. The (icing | de-icing) of wings is another problem and measures have been developed to combat it.
4. Even in the 1940s, several Yakovlev Yak-9s experienced delamination of (wood | chip board | plywood) in their construction.
5. The use of (lacunas or misting systems |smoke hoods) were examined although both were rejected.
6. Bird strike is an aviation term for a (crash | collision) between a bird and an aircraft. It is a common threat to aircraft safety and has caused a number of fatal accidents.
7. An electrical fire on Air Canada Flight 797 in 1983 caused the deaths of 23 of the 46 passengers, resulting in the introduction of (floor level lighting | evacuation) route to assist people to evacuate a (survivability | smoke-filled aircraft).
8. The tests measure (flammability | fire bottles) and the (toxicity | survivability) of smoke.
9. Poisonous grass can be planted that is not palatable to birds, nor to insects that attract (high-bypass | insectivorous) birds.

10. As the failure develops inside the material, nothing is shown on the surface; (cyclic stress | instrument methods), often (de-iced | ultrasound-based), have to be used to detect such a material failure.

Exercise 10. Say whether the following statements are true or false. Correct false statements.

1. Incorrect information given by the control tower, or delayed instructions, are major factors that impact on the number of accidents.
2. The dangers of more powerful positive lightning were understood after the destruction of a glider in 1999.
3. However, as more and more aircraft, like the upcoming Boeing 787, whose whole exterior is made of non-conducting composite materials take to the skies, additional design effort and testing must be made before certification authorities will permit these aircraft in commercial service.
4. The automatic deployment of the ram air turbine maintained the necessity of hydraulic pressure to the flight controls, so that the pilots were able to land with only a minimal amount of damage to the plane, and minor injuries to only some of passengers.
5. When subjected to cyclic stress, the fibres may tear off the matrix, the layers of the material then separate from each other – a process called delamination, and form a mica-like structure which then falls apart.
6. Stalls are less dangerous at high altitudes that is not referred to the period during takeoff and landing.
7. Failure of the shotgun or of the aircraft body may be caused by metal fatigue
8. The use of smoke holes or misting systems were also examined and accepted.
9. Military aircraft designed for high-speed flight typically have pure turbojet, or low-bypass turbofan engines, increasing the risk that ingested materials will get into the core of the engine to cause damage.
10. Poisonous grass is not allowed to be planted that is not palatable to birds, nor to insects that attract insectivorous birds.

Exercise 11. Imagine you are in one of the following situations. Make up the dialogues.

1. You are at the conference dedicated to aviation security and meet a friend of yours. Discuss questions that were interesting and what you disagree with.
2. You are a passenger talking to an airport safety manager. Ask him/her about countermeasures taken to provide safety. Suggest your own.

Exercise 12. Write a report on one of the following topics.

1. Organizations and documents providing aviation safety.
2. Most tragic aircraft accidents and its reasons.
3. Icing and de-icing in aviation.
4. Bird strikes, problem and solutions.
5. Aircraft accidents factors.

Exercise 13. Fill in the correct word from the box below.

Positive lightning; voice warnings; coarse frost; expand and break off any accumulated ice; catastrophic; warning horns; low-bypass turbofan engines; inflight icing conditions; airline dispatch offices; stalling; floor level lighting; smoke-filled aircraft; non-conducting composite materials; stick shakers; inlets; ice buildup; "boots"

1. The dangers of more powerful _____ were not understood until the destruction of a glider in 1999.
2. However, as more and more aircraft, like the upcoming Boeing 787, whose whole exterior is made of _____ take to the skies, additional design effort and testing must be made before certification authorities will permit these aircraft in commercial service.
3. Even a small amount of ice or _____ can greatly decrease the ability of a wing to develop lift. This could prevent an aircraft from taking off.
4. If ice builds up during flight the result can be _____as evidenced by the crash of American Eagle Flight 4184 (an ATR 72 aircraft) near Roselawn, Indiana on October 31, 1994, killing 68, or Air Florida Flight 90.
5. Finally, _____ keep watch on weather along the routes of their flights, helping the pilots avoid the worst of _____.
6. Modern airliners are designed to prevent _____ on wings, engines, and tails (empennage) by either routing heated air from jet engines through the leading edges of the wing, tail, and _____, or on slower aircraft, by use of inflatable rubber _____ that _____.
7. An electrical fire on Air Canada Flight 797 in 1983 caused the deaths of 23 of the 46 passengers, resulting in the introduction of _____ to assist people to evacuate a _____.
8. These include stall _____ (now standard on virtually all powered aircraft), _____ and _____.
9. Military aircraft designed for high-speed flight typically have pure turbojet, or_____, increasing the risk that ingested materials will get into the core of the engine to cause damage.
10. _____ an aircraft (increasing the angle of attack to a point at which the wings fail to produce enough lift), can be dangerous and can result in a crash unless the pilot reacts in the proper manner.

Exercise 14. Paraphrase the following sentences:

1. A pilot can fly the plane in a dangerous way when misinformed by a printed document, by reacting to a wrong instruments or indicator or by following defective instructions or information from flight or ground control.

2. If ice builds up during flight the result can be fatal.
3. The last time when engine crash happened in 1979.
4. The tests are aimed to measure the level of combustibility of smoke.
5. The luggage department on most aircraft are equipped with "fire bottles" to battle against fire that might occur.

Text 2.

Read and translate the following text.

Human Factors

Human factors including pilot error are another potential danger, and currently the most common factor of aviation crashes. Much progress in applying human factors to improving aviation safety was made around the time of World War II by people such as Paul Fitts and Alphonse Chapanis. However, there has been progress in safety throughout the history of aviation, such as the development of the pilot's checklist in 1937. Pilot error and improper communication are often factors in the collision of aircraft. This can take place in the air (1978 Pacific Southwest Airlines Flight 182) (TCAS) or on the ground (1977 Tenerife disaster) (RAAS). The ability of the flight crew to maintain situational awareness is a critical human factor in air safety. Human factors training is available to general aviation pilots and called single pilot resource management training.

Failure of the pilots to properly monitor the flight instruments resulted in the crash of Eastern Air Lines Flight 40 in 1972 (CFIT), and error during take-off and landing can have catastrophic consequences, for example cause the crash of Prinair Flight 191 on landing, also in 1972.

Rarely, flight crew members are arrested or subject to disciplinary action for being intoxicated on the job. In 1990, three Northwest Airlines crew members were sentenced to jail for flying from Fargo, North Dakota to Minneapolis-Saint Paul International Airport while drunk. In 2001, Northwest fired a pilot who failed a breathalyzer test after flying from San Antonio, Texas to Minneapolis-Saint Paul. In July 2002, two America West Airlines pilots were arrested just before they were scheduled to fly from Miami, Florida to Phoenix, Arizona because they had been drinking alcohol. The pilots have been fired from America West and the FAA revoked their pilot's licenses. The incident created a public relations problem and America West has become the object of many jokes about drunk pilots. At least one fatal airliner accident involving drunk pilots has occurred when Aero Flight 311 crashed killing all 25 on board in 1961, which underscores the role that poor human choices can play in air accidents.

Human factors incidents are not limited to errors by the pilots. The failure to close a cargo door properly on Turkish Airlines Flight 981 in 1974 resulted in the loss of the aircraft - however the design of the cargo door latch was also a major factor in the incident. In the case of Japan Airlines Flight 123, improper maintenance resulted in the loss of the vertical stabilizer.

Exercise 1. Answer the questions:

1. What is currently the most common factor of aviation crashes?
2. What factors are the most frequent in the collision of aircraft?
3. What failure resulted in the crash of Eastern Air Lines Flight 40 in 1972?
4. Why did Northwest fire a pilot in 2001?
5. Why were two America West Airlines pilots arrested in 2002?
6. Are human factors incidents limited to errors by the pilots? Give examples.

Exercise 2. Say whether the following statements are true or false. Correct false statements.

1. Human factors including pilot error are another potential danger, and currently the most common factor of aviation crashes.
2. Pilot error and improper communication are not often factors in the collision of aircraft.
3. The ability of the flight crew to maintain situational awareness is a critical human factor in air safety.
4. In 2001, Northwest hired a pilot who failed a breathalyzer test after flying from San Antonio, Texas to Minneapolis-Saint Paul.
5. The pilots have been fired from America West and the FAA revoked their pilot's licenses.

Exercise 3. Paraphrase the following sentences.

1. Much progress in applying human factors to improving aviation safety was made around the time of World War II by people such as Paul Fitts and Alphonse Chapanis.
2. Failure of the pilots to properly monitor the flight instruments resulted in the crash of Eastern Air Lines Flight 40 in 1972 (CFIT), and error during take-off and landing can have catastrophic consequences, for example cause the crash of Prinair Flight 191 on landing, also in 1972.
3. Rarely, flight crew members are arrested or subject to disciplinary action for being intoxicated on the job.
4. At least one fatal airliner accident involving drunk pilots has occurred when Aero Flight 311 crashed killing all 25 on board in 1961, which underscores the role that poor human choices can play in air accidents.
5. The failure to close a cargo door properly on Turkish Airlines Flight 981 in 1974 resulted in the loss of the aircraft - however the design of the cargo door latch was also a major factor in the incident.

Exercise 4. Finish the sentences.

1. Human factors including pilot error are another potential danger, and currently the most common factor of ...
2. Pilot error and improper communication are often factors in ...
3. The ability of the flight crew to maintain situational awareness is ...
4. Human factors training is available to general aviation pilots and called ...
5. Rarely, flight crew members are arrested or subject to disciplinary action for being ...
6. The pilots have been fired from America West and the FAA revoked ...

Exercise 5. Make up your own sentences using the following terms:

human factor, a breathelizer test, disciplinary action, pilot error, situational awareness, improper maintenance.

Unit 3. Aviation Accidents

Text 1.

Read and translate the following text into Ukrainian.

Causes and Common Types of Aviation Accidents

The causes of aviation accidents vary greatly depending on specific circumstances and problems that may develop during the flight process.

1. Decent and Landing Accidents

Descent and landing accidents account for 36 percent of all general aviation mishaps and the most common type of accident. There are five stages of the descent and landing process. These include descent, approach, landing, go-around or aborted landing, and taxi.

2. Aborted Landings

An aborted landing is a circumstance where the pilot of a plane must take control and abandon his or her landing plan for a safer alternative. This usually requires a second go-around followed by a successful landing, but sometimes complications can arise. Aborted landings are done out of necessity and to ensure the safety of all pilots and passengers involved.

3. Defective Landing Gear

Landing a plane safely is perhaps the most important part of a pilot's job. Sometimes this task is complicated not through the fault of a pilot but as a result of defective landing gear on the plane itself. It is not difficult to imagine the complications and disasters defective landing gear could cause.

4. Taxi and Takeoff Accidents

One of the most important parts of a flight is the preflight and planning stages of the operation. This involves preflight inspections for safety, flight preparation, taxiing, and takeoff. When combined, taxi and takeoff accidents account for about 22 percent of all commercial jet airplane accidents and about 22 percent of all fatalities.

5. Preflight Accidents

Before taking off, it is the responsibility of the pilot or airline to perform a complete inspection of the plane to make absolutely certain it is safe to be airborne. This process involves the checking of gauges, displays, instruments, and all parts of the plane to ensure its safety.

6. Climbout Accidents

The period of flight during takeoff and climbout can be extremely dangerous for pilots and passengers alike. Much of the uncertainty during this time can be prevented with effective flight planning. However, when pilots or staff members fail to be vigilant in planning their ascent, climbout accidents may be more likely to occur.

7. Mechanical Failures

No form of transportation is completely safe, and no machine is completely foolproof. Murphy's Law states that anything that can go wrong will go wrong. Tragically, this sometimes applies to aviation accidents when mechanical failures occur. Mechanical failure is responsible for 13 percent of all commercial airplane accidents from 1950 through 2004.

8. Electrical Malfunctions

Aging electrical systems on older airplanes can cause severe aviation accidents. Electrical malfunctions can be deadly because electrical systems control many of the instruments pilots rely on to fly steadily. When these instruments are unreadable, pilots must fly blindly and the lives of pilots and passengers are put at risk.

9. Fixed-Wing Accidents

When most people think of an airplane, the mental image they conjure up is that of a fixed-wing aircraft. The term fixed-wing can apply to monoplanes, biplanes, and triplanes. Fixed-wing airplanes are by far the most commonly used vehicles for commercial and recreational recreation.

10. Engine Failure

Engine failure is a mechanical problem that can easily lead to aviation accidents. There are many reasons engine failure may occur, including an insufficient fuel supply and the breaking of engine parts. Pilots and crew are specially trained to manage engine failure as best they can by gliding the plane to a safe landing, but sometimes the aviation accidents resulting from this mechanical problem can be horrific.

11. Defective Landing Gear

When mechanical problems affect the landing gear of an aircraft, a pilot's ability to land safely is compromised. Defective landing gear can result in panic and quick decisions that have lead to truly tragic aviation accidents in the past.

12. Defective Rudder

The rudder on an aircraft is an essential component on the tail that is used by the pilot to control the yaw axis. In aviation, the yaw axis describes the rotation about the vehicle's normal axis or center of mass. The rudder of an airplane is usually controlled by foot pedals, and when the pedals or rudder are defective the pilot becomes unable to fully control the plane.

13. Defective Gauges/Instruments

The gauges and instruments in the cockpit of an aircraft allow the pilot to control the vehicle he or she is flying. These gauges and instruments provide power, fuel supply, temperature, altitude, speed, position and other information that allows the aircraft to operate safely.

14. Pilot Errors and Negligence

When most people make mistakes at their jobs, their employment can be terminated. When pilots are negligent or make errors while on the job, there is the potential for hundreds of lives to be terminated. Pilots receive extensive training designed to prepare them to handle a wide variety of situations, but there are times when fatal mistakes are made.

15. Faulty Flight Maneuvers

Faulty flight maneuvers can be avoided when pilots are cautious and act professionally. Steep turns, slow flight, stalls and stall recovery, spins and spin recovery, and forced landings are all procedures that pilots should have mastered before earning their license.

16. Pilot Heart Attack/ Stroke

Pilots are under tremendous amounts of stress while flying. It is their duty to ensure the safety of themselves and all the passengers on board. US Navy studies have found that most pilots experience an increase in their heart rate when landing or taking off that can be explained by the high level of concentration required to perform these tasks safely.

17. Pilot Intoxication

Federal law dictates that pilots cannot drink alcohol within eight hours of a flight. This is because the level of attention to safely pilot an aircraft is extremely high. Studies have suggested that the number of serious errors made by pilots dramatically increases at blood alcohol concentration (BAC) levels as low as 0.025%. The effects of alcohol consumption can impact pilots who are not intoxicated at the time of flying.

18. Pilot Epileptic Attack

People diagnosed with epilepsy are forbidden by law to fly aircraft by the Federal Aviation Administration. This is due to the incapacitating effects an epileptic seizure could have on a pilot. Although there are different forms of epilepsy and a wide range of seizure severity, individuals suffering from epilepsy may not become licensed pilots.

19. Fuel Mismanagement

Fuel mismanagement often results in some of the most avoidable aviation accidents. There are two main forms of fuel mismanagement: fuel exhaustion and fuel starvation. Fuel exhaustion takes place when the aircraft is completely out of fuel, while fuel starvation occurs when fuel remains but the pilot does not switch tanks after one runs dry.

20. Gas/ Fuel Leak

When a gas or fuel leak occurs, fuel mismanagement is likely to occur. When pilots plan their flights they load their aircraft with fuel accordingly. The onset of a leak can severely shorten the amount of time one may safely fly. Pilots must act quickly when they observe a leak taking place. In some instances, by acting quickly and appropriately pilots may be able to avert an aviation accident.

21. Wrong Fuel Usage

It is extremely important for the correct fuel to be used in aircraft engines. Reciprocating engines require avgas, while turbine engines must run on jet fuel. Engine damage and other malfunctions are common consequences of using the wrong fuel. In some cases damage may occur slowly over time but in other circumstances overheating or combustion may take place.

22. Fuel Pump Malfunction

Aircraft fuel is what feeds engines and allows a vehicle to become and remain airborne. When the supply of fuel is interrupted, the fate of the aircraft is jeopardized. The fuel pump of an aircraft allows fuel to be distributed from tanks to the engines. When fuel pump malfunctions occur the results can be deadly.

23. Inclement Weather

Over an eleven year period there were over five thousand light aircraft accidents in the United States relating to inclement weather. Of these, over 1,700 resulted in fatalities.

Although poor weather conditions are beyond the control of pilots, airlines, and flight crew, these people have a responsibility for the safety of their passengers. When the decision is made to go ahead with a flight despite weather advisories, the lives of others are put at risk.

24. Lightning

It is estimated that on average each commercial airplane in the United States is struck by lightning at least once per year. Although it is extremely rare for aviation accidents to directly result from lightning contact, complications and other distractions may occur that could divert a pilot's attention from his or her flight plan.

25. Wind and Wind Shear

During an eleven year period, 48 percent of light aircraft weather accidents were caused by winds blowing aircraft off the side or end of a runway on takeoff. Although light aircraft are most affected by winds, larger aircrafts can be unexpectedly moved around as well. When this occurs a sense of panic may fill the cabin as passengers question their own safety and the competence of their pilots.

26. Snow

As anyone might suspect, flying in the snow can be a dangerous adventure. Pilots should not fly in whiteout conditions such as blizzards. At these times visibility is often so poor that instruments must be relied upon almost exclusively to determine one's position and surroundings.

27. Rain

Rain and thunderstorms can be extremely hazardous to aviation. Turbulence, cumulus clouds, high winds, ice, hail, lightning, loss of visibility, electrostatic discharge, tornadoes, altimetry errors, and wet runways often accompany rain and must be managed by pilots and flight crews. In most situations, pilots are instructed to avoid severe thunderstorms and rain due to the risks they may pose for passengers and crew.

28. Other Causes of Airplane Accidents

Beyond the obvious hazards that can contribute to an aviation accident, other causes exist. It is important for these possibilities to be taken into consideration so that the lives of passengers and other innocent people are not jeopardized by the short-sightedness of crew.

29. Bird Hazards

Although many people may not realize it, birds are a common threat to airline safety. A number of fatal accidents have been caused by bird strike, one of which killed 62 passengers in 1960. Bird strike is such a serious problem that the FAA estimates it costs United States aviation $480 million each year.

30. Mid-Air Collisions

A mid-air collision is every pilot and passenger's worst nightmare and one of the most dramatic types of aviation accident. Mid-air collisions are almost always due to human error, and are entirely preventable. Pilots receive training to avoid potentially dangerous situations, but when this preparation is overlooked fatal consequences may occur.

31. Air Traffic Control Errors

Not all air traffic control errors result in aviation accidents. Many errors are only described as "close calls", where a mistake was made but no accident took place. However, nobody wants to put their life at risk with "close calls" when they are travelling hundreds of miles per hour at thousands of feet above ground.

32. Structural Defects

Structural defects can lead to dramatic and unpredictable aviation accidents. Defects can range from faulty or aging wires to corrosion and fuselage loss. In 1988, a Boeing 737 flown by Aloha Airlines experienced a ruptured fuselage, tearing part of the cabin apart and blowing a flight attendant off the plane and to her death. The accident was caused by problems with the adhesive bonding process, a problem Boeing was already aware of.

33. Lack of Maintenance on an Airplane

Without maintenance, any aircraft will eventually become a serious hazard. Commercial, military, and private aviation organizations employ aircraft maintenance technicians to constantly work on aircraft to keep them safe and in working order. In the vast majority of cases, the work done is timely and of high quality, contributing the overall safety of flight as a mode of transportation.

Exercise 1. Using a monolingual dictionary of aviation or encyclopedia, please, find the definition of the following words and word combinations.

Mishap, aborted landing, go-around, defective landing gear, airborne, climbout accidents, foolproof, ruptured fuselage, close calls, jeopardize, turbulence, cumulus clouds, high winds, ice, hail, lightning, loss of visibility, electrostatic discharge, tornadoes, altimetry errors, wet runways, onset of a leak, fuel exhaustion, fuel starvation, epileptic seizure, pilot intoxication, faulty flight manoeuvres, pilot negligence.

Exercise 2. State whether the following statements are true or false. Correct false statements.

1. The causes of aviation accidents vary greatly depending on specific circumstances and problems that may develop during the flight process.
2. Landing a plane safely accounts for 36 percent of all general aviation mishaps and is the most common type of accident.
3. Descent and landing accidents is perhaps the most necessary part of a pilot's job.
4. Preflight and planning stages of the operation involve preflight inspections for safety, flight preparation, taxiing, and takeoff.
5. An aborted landing is the responsibility of the pilot or airline to perform a complete inspection of the plane to make absolutely certain it is safe to be airborne.

6. When pilots or staff members fail to be vigilant in planning their ascent, climbout accidents may be more likely to occur.

7. When mechanical problems affect the fixed-wing, a pilot's ability to land safely is compromised.

8. Murphy's Law states that anything that can go wrong will go wrong.

9. Faulty flight maneuvers can't be avoided when pilots are cautious and act professionally.

10. The rudder on an aircraft is an essential component on the tail that is used by the pilot to control the yaw axis.

Exercise 3. Open the brackets. Choose the correct word in brackets and complete the sentences.

1. The *(elevator, rudder, aileron)* on an aircraft is an essential component on the tail that is used by the pilot to control the yaw axis.

2. The rudder of an airplane is usually controlled by *(foot pedals, flaps, joystick)*, and when the pedals or rudder are defective the pilot becomes unable to fully control the plane.

3. Federal law dictates that pilots cannot drink alcohol within *(two, five, eight)* hours of a flight.

4. People diagnosed with *(flu, epilepsy, cancer)* are forbidden by law to fly aircraft by the Federal Aviation Administration.

5. *(Fuel exhaustion, fuel injection, fuel starvation)* takes place when the aircraft is completely out of fuel.

6. *(Fuel injection, fuel starvation, fuel exhaustion)* occurs when fuel remains but the pilot does not switch tanks after one runs dry.

7. Reciprocating engines require avgas, while turbine engines must run on *(jet fuel, alternative fuel, gas fuel)*.

8. *(Lift, gas, aircraft fuel)* is what feeds engines and allows a vehicle to become and remain airborne.

9. *(The fuel pump, fuel tank, fuel battery)* of an aircraft allows fuel to be distributed from tanks to the engines.

10. A number of fatal accidents have been caused by *(wind strike, bird strike, rain strike)*, one of which killed 62 passengers in 1960.

Exercise 4. Answer the questions:

1. What percent of all general aviation mishaps do descent and landing accidents account for?
2. What is an aborted landing?
3. What do preflight and planning stages of the operation involve?
4. What responsibility does a pilot or airline have before taking off?
5. Are all the machines always completely foolproof?
6. What kind of failure is responsible for 13 percent of all commercial airplane accidents from 1950 through 2004?
7. What can aging electrical systems on older airplanes cause?
8. What can happen, when pilots are negligent or make errors while on the job?
9. What can happen when a gas or fuel leak occurs?
10. Birds are a common threat to airline safety, aren't they?

Exercise 5. Finish the sentences:

1. The term fixed-wing can apply to…
2. Engine failure is a mechanical problem that can easily lead to…
3. The rudder on an aircraft is an essential component on the tail that is used by the pilot to control…
4. Steep turns, slow flight, stalls and stall recovery, spins and spin recovery, and forced landings are all procedures that pilots should have mastered before…
5. Federal law dictates that pilots cannot drink alcohol…
6. Studies have suggested that the number of serious errors made by pilots dramatically increases at blood alcohol concentration (BAC) levels as low as…
7. People diagnosed with epilepsy are forbidden by law to fly aircraft by…
8. There are two main forms of fuel mismanagement: …
9. When the supply of fuel is interrupted, the fate of the aircraft is…
10. It is estimated that on average each commercial airplane in the United States is struck by lightning at least…

Exercise 6. Match the word to the appropriate definition.

1. A mid-air collision	a. an essential component on the tail that is used by the pilot to control the yaw axis.
2. Aircraft fuel	b. one of the most important parts of a flight.
3. Engine damage	c. what feeds engines and allows a vehicle to become and remain airborne.
4. The rudder on an aircraft	d. a circumstance where the pilot of a plane must take control and abandon his or her landing plan for a safer alternative.
5. Engine failure	e. the most common type of accident.
6. Preflight and planning stages of the operation	f. every pilot and passenger's worst nightmare and one of the most dramatic types of aviation accident.
7. Landing a plane safely	g. a mechanical problem that can easily lead to aviation accidents.
8. An aborted landing	h. that anything that can go wrong will go wrong.
9. Descent and landing accident	i. common consequence of using the wrong fuel.
10. Murphy's Law	j. the most important part of a pilot's job.

Exercise 7. Match the word to the most appropriate translation.

1. Aborted landing	a. зсув вітру

2. Gauge	b. надійний, безпечний; захищений від поломки
3. Foolproof	c. зіткнення в повітрі
4. Fuel leak	d. рулювання
5. Wind shear	e. передчасна посадка
6. Mid-air collision	f. огляд перед відльотом
7. Air traffic control	g. калібр
8. Fuel pump	h. керування повітряним рухом
9. Taxiing	i. витік пального
10. Preflight inspection	j. паливний насос

Exercise 8. Match the word in column A with those in column B in order to make an appropriate word-combination, as in the example: *aborted landing.*

1. Aborted	a. landing
2. Mid-air	b. leak
3. Preflight	c. malfunctions
4. Fuel	d. shear
5. Wind	e. control
6. Landing	f. pump
7. Air traffic	g. inspection
8. Fuel	h. hazards
9. Electrical	i. gear
10. Bird	j. collision

Exercise 9. Complete the following sentences with the words given in brackets.

1. There are five stages of the descent and landing process: descent, approach, landing, go-around or aborted landing, and *(рулювання).*
2. Preflight involves preflight inspections for safety, flight preparation, taxiing, and *(зліт).*
3. Aging electrical systems on older airplanes can cause severe *(авіакатастрофи).*
4. When these instruments are unreadable, pilots must fly blindly and the lives of pilots and passengers are *(піддаються ризику).*
5. The term fixed-wing can apply to monoplanes, biplanes, and *(трипланів).*
6. People diagnosed with epilepsy are forbidden by law to fly aircraft by the *(Федеральним управлінням ЦА США).*
7. There are two main forms of fuel mismanagement: fuel exhaustion and *(нестача пального).*
8. Reciprocating engines require avgas, while turbine engines must run on (*пальному для реактивних двигунів)*.
9. During an eleven year period, 48 percent of light aircraft weather accidents were caused by winds blowing aircraft off the side or end of *(злітно-посадкової смуги).*
10. At these times visibility is often so poor that instruments must be relied upon almost exclusively to determine one's position and *(прилеглі території).*

Exercise 10. Put questions to the underlined part of the sentences.

1. Structural defects can lead to dramatic and unpredictable aviation accidents.
2. Commercial, military, and private aviation organizations employ aircraft maintenance technicians to constantly work on aircraft to keep them safe and in working order.
3. A mid-air collision is every pilot and passenger's worst nightmare and one of the most dramatic types of aviation accident.
4. Bird strike is such a serious problem that the FAA estimates it costs United States aviation $480 million each year.
5. Rain and thunderstorms can be extremely hazardous to aviation.
6. During an eleven year period, 48 percent of light aircraft weather accidents were caused by winds blowing aircraft off the side or end of a runway on takeoff.
7. Aircraft fuel is what feeds engines and allows a vehicle to become and remain airborne.
8. Reciprocating engines require avgas, while turbine engines must run on jet fuel.
9. Pilots must act quickly when they observe a leak taking place.
10. Fuel exhaustion takes place when the aircraft is completely out of fuel.

Exercise 11. Give Ukrainian equivalents to the following word combinations.

1. Decent and landing accidents
2. Aborted landing
3. Taxi and takeoff accidents
4. Electrical malfunction
5. Flight maneuvers
6. Federal Aviation Administration
7. Fuel mismanagement
8. Wind shear
9. Mid-air collision

10. Air traffic control.

Exercise 12. Find English equivalents in the text.

1. Зниження; зменшення висоти польоту
2. Наближення
3. Кружляння
4. Вирулювання
5. Посадка
6. Зліт
7. Огляд перед відльотом
8. Підготовка до польоту
9. Аварія при наборі висоти
10. Надійний, безпечний; захищений від поломки.

Exercise 13. Translate into English.

1. Аварії при зменшенні висоти та приземленні становлять 36 відсотків усіх нещасних випадків у сфері авіації та вважаються найхарактернішим видом аварій.
2. Передчасна посадка – це ситуація, коли пілот літака повинен взяти все під контроль та відмовитися від свого плану посадки задля безпечного приземлення.
3. Безпечна посадка літака можливо є найважливішою частиною роботи пілота.
4. Одними з найважливіших частин польоту є етапи планування вильоту.
5. Політ під час злету та при наборі висоти може бути надзвичайно небезпечним як для пілотів, так і для пасажирів.
6. Жоден вид транспорту не є у повній мірі безпечним, і жоден механізм не є у повній мірі надійним.
7. Несправність двигуна – це механічна несправність, яка може легко призвести до авіакатастрофи.
8. Руль напрямку літака є важливим компонентом його хвостової частини, пілот користується ним з метою керування рисканням.
9. Несправність подачі пального часто стає результатом деяких авіакатастроф, яких можна було уникнути.
10. Коли виникає витік газу чи пального, то може статися несправність подачі пального.

Exercise 14. Translate into Ukrainian.

1. Pilots must act quickly when they observe a leak taking place.
2. Reciprocating engines require avgas, while turbine engines must run on jet fuel.
3. Engine damage and other malfunctions are common consequences of using the wrong fuel.
4. The fuel pump of an aircraft allows fuel to be distributed from tanks to the engines.
5. Although poor weather conditions are beyond the control of pilots, airlines, and flight crew, these people have a responsibility for the safety of their passengers.
6. As anyone might suspect, flying in the snow can be a dangerous adventure.
7. Turbulence, cumulus clouds, high winds, ice, hail, lightning, loss of visibility, electrostatic discharge, tornadoes, altimetry errors, and wet runways often accompany rain and must be managed by pilots and flight crews.
8. Although many people may not realize it, birds are a common threat to airline safety.
9. Bird strike is such a serious problem that the FAA estimates it costs United States aviation $480 million each year.
10. A mid-air collision is every pilot and passenger's worst nightmare and one of the most dramatic types of aviation accident.

Exercise 15. Report.

Write a report on Causes and Common Types of Aviation Accidents. Your report should be brief and contain only the most important information. You can care to get some pictures to make your report more interesting. Remember that you should not read your report but be ready to present it to the audience.

Text 2.

Read and translate the following text into Ukrainian.

Volcanic Ash

Plumes of volcanic ash near active volcanoes present a risk especially for night flights. The ash is hard and abrasive and can quickly cause significant wear on the propellers and turbocompressor blades, and scratch the cockpit windows, impairing visibility. It contaminates fuel and water systems, can jam gears, and can cause a flame out of the engines. Its particles have low melting point, so they melt in the combustion chamber and the ceramic mass then sticks on the turbine blades, fuel nozzles, and the combustors, which can lead to a total engine failure. It can get inside the cabin and contaminate everything there, and can damage the airplane electronics.

There are many instances of damage to jet aircraft from ash encounters. In one of them in 1982, British Airways Flight 9 flew through an ash cloud, lost all four engines, and descended from 36,000 ft (11,000 m) to only 12,000 ft

(3,700 m) before the flight crew managed to restart the engines. A similar incident occurred on December 15, 1989 involving KLM Flight 867.

With the growing density of air traffic, encounters like this are becoming more common. In 1991 the aviation industry decided to set up Volcanic Ash Advisory Centers (VAACs), one for each of 9 regions of the world, acting as liaisons between meteorologists, volcanologists, and the aviation industry.

Prior to the European air travel disruption of April 2010, aircraft engine manufacturers had not defined specific particle levels above which engines were considered to be at risk. The general approach taken by airspace regulators was that if the ash concentration rose above zero, then the airspace was considered unsafe and was consequently closed.

The April 2010 eruptions of Eyjafjallajökull caused sufficient economic difficulties that aircraft manufacturers were forced to define specific limits on how much ash is considered acceptable for a jet engine to ingest without damage. In April, the CAA, in conjunction with engine manufacturers, set the safe upper limit of ash density to be 2 mg per cubic metre of air space.

From noon 18 May 2010, the CAA revised the safe limit upwards to 4 mg per cubic metre of air space.

In order to minimise the level of further disruption that this and other volcanic eruptions could cause, the CAA announced the creation of a new category of restricted airspace called a Time Limited Zone. Airspace categorised as TLZ is similar to airspace experiencing severe weather conditions in that the restrictions are expected to be of a short duration; however, the key difference with TLZ airspace is that airlines must produce certificates of compliance in order for their aircraft to enter these areas. Flybe was the first airline to conform to these regulations and their aircraft will be permitted to enter airspace in which the ash density is between 2 mg and 4 mg per cubic metre.

Any airspace in which the ash density exceeds 4 mg per cubic metre is categorised as a no fly zone.

It is important to make a distinction between flight through (or in immediate vicinity of) the eruption plume and flight through so-called affected airspace. Volcanic ash in the immediate vicinity of the eruption plume is of an entirely different particle size range and density to that found in downwind dispersal clouds which contain only the finest grade of ash. The ash loading at which this process affects normal engine operation is not established beyond the awareness that relatively high ash densities must exist. Whether this silica-melt risk remains at the much lower ash densities characteristic of downstream ash clouds is currently unclear. This is therefore a serious safety hazard which invites preventive risk management strategies in line with other comparable aviation risks.

Exercise 1. Answer the questions:

1. How does volcanic ash affect turbocompressor blades?
2. What happens with volcanic ash particles in the combustion chamber?
3. What happened with British Airways Flight 9 in 1982?
4. What aviation safety entities were established in 1991? What is their function?
5. What is the safe upper limit of ash density?
6. How do they categorize any airspace in which the ash density exceeds 4 mg per cubic metre?
7. Is there any distinction between flight through (or in immediate vicinity of) the eruption plume and flight through so-called affected airspace?
8. What strategies are employed to fight this safety hazard?

Exercise 2. Say whether the following statements are true or false. Correct false statements.

1. Plumes of volcanic ash near active volcanoes present a risk especially for night flights.
2. Prior to the European air travel disruption of April 2010, aircraft engine manufacturers had not defined specific particle levels above which engines were considered to be at risk.
3. The April 2010 eruptions of Eyjafjallajökull didn't cause sufficient economic difficulties that aircraft manufacturers were forced to define specific limits on how much ash is considered acceptable for a jet engine to ingest without damage.
4. From noon 18 May 2010, the CAA revised the safe limit downwards to 3 mg per cubic metre of air space.
5. Volcanic ash in the immediate vicinity of the eruption plume is of an entirely different particle size range and density to that found in downwind dispersal clouds which contain only the finest grade of ash.

Exercise 4. Finish the sentences.

1. The ash is hard and abrasive and can quickly cause significant wear on ...
2. In 1991 the aviation industry decided to set up Volcanic Ash Advisory Centers (VAACs), one for each of 9 regions of the world, acting as liaisons between ...
3. From noon 18 May 2010, the CAA revised the safe limit upwards to ...
4. In order to minimise the level of further disruption that this and other volcanic eruptions could cause, the CAA announced the creation of a new category of restricted airspace called ...
5. Any airspace in which the ash density exceeds 4 mg per cubic metre is categorised as ...
6. It is important to make a distinction between flight through (or in immediate vicinity of) the eruption plume and flight through so-called ...

Exercise 4. Paraphrase the following sentences.

1. Prior to the European air travel disruption of April 2010, aircraft engine manufacturers had not defined specific particle levels above which engines were considered to be at risk.

2. In order to minimise the level of further disruption that this and other volcanic eruptions could cause, the CAA announced the creation of a new category of restricted airspace called a Time Limited Zone.

3. Airspace categorised as TLZ is similar to airspace experiencing severe weather conditions in that the restrictions are expected to be of a short duration; however, the key difference with TLZ airspace is that airlines must produce certificates of compliance in order for their aircraft to enter these areas.

4. Volcanic ash in the immediate vicinity of the eruption plume is of an entirely different particle size range and density to that found in downwind dispersal clouds which contain only the finest grade of ash.

5. This is therefore a serious safety hazard which invites preventive risk management strategies in line with other comparable aviation risks.

Exercise 5. Make up your own sentences using the following terms:

volcanic ash, turbocompressor blades, air travel disruption, safe upper limit of ash density, time limited zone, no fly zone, downwind dispersal clouds.

Text 3.

Read and translate the following text.

Controlled Flight into Terrain

Controlled flight into terrain is a class of accident in which an undamaged aircraft is flown, under control, into terrain or man-made structures. CFIT accidents typically are a result of pilot error or of navigational system error. Some pilots, convinced that advanced electronic navigation systems such as GPS and inertial guidance systems (inertial navigation system or INS) coupled with flight management system computers, or over-reliance on them, are partially responsible for these accidents, have called CFIT accidents "computerized flight into terrain". Failure to protect Instrument Landing System critical areas can also cause controlled flight into terrain. One of the most notable CFIT accidents was in December 1995 in which American Airlines flight 965 tracked off course while approaching Calí, Colombia and hit a mountainside after the speed brakes were left deployed despite an aural terrain warning in the cockpit and an attempt to gain ample altitude in the night-time conditions. Crew awareness and monitoring of navigational systems can prevent or eliminate CFIT accidents. Crew Resource Management is a modern method now widely used to improve the human factors of air safety. The Aviation Safety Reporting System, or ASRS is another.

Other technical aids can be used to help pilots maintain situational awareness. A ground proximity warning system is an on-board system that will alert a pilot if the aircraft is about to fly into the ground. Also, air traffic controllers constantly monitor flights from the ground and at airports.

Exercise 1. Answer the questions:

1. What is controlled flight into terrain?
2. What is computerized flight into terrain?
3. What was one of the most notable CFIT accidents?
4. What can prevent or eliminate CFIT accidents?
5. What modern methods now are widely used to improve the human factors of air safety?

Exercise 2. Say whether the following statements are true or false. Correct false statements.

1. CFIT accidents typically are a source of pilot error or of navigational system error.
2. Failure to protect Instrument Landing System critical areas can also cause controlled flight into terrain.
3. Crew awareness and monitoring of navigational systems cannot prevent or eliminate CFIT accidents.
4. Crew Resource Management is a modern method now widely used to improve the human factors of air safety. The Aviation Safety Reporting System, or ASRS is another.
5. Air traffic controllers constantly monitor flights from the ground and at airports.

Exercise 3. Paraphrase the following sentences.

1. Some pilots, convinced that advanced electronic navigation systems such as GPS and inertial guidance systems (inertial navigation system or INS) coupled with flight management system computers , or over-reliance on them, are partially responsible for these accidents, have called CFIT accidents "computerized flight into terrain".
2. One of the most notable CFIT accidents was in December 1995 in which American Airlines flight 965 tracked off course while approaching Calí, Colombia and hit a mountainside after the speed brakes were left deployed despite an aural terrain warning in the cockpit and an attempt to gain ample altitude in the night-time conditions.
3. Crew awareness and monitoring of navigational systems can prevent or eliminate CFIT accidents. Crew Resource Management is a modern method now widely used to improve the human factors of air safety.
4. Other technical aids can be used to help pilots maintain situational awareness.
5. Controlled flight into terrain is a class of accident in which an undamaged aircraft is flown, under control, into terrain or man-made structures.

Exercise 4. Finish the sentences.

1. CFIT accidents typically are a result of ...

2. Failure to protect Instrument Landing System critical areas can also cause ...
3. Crew awareness and monitoring of navigational systems can prevent or eliminate ...
4. Other technical aids can be used to help pilots maintain ...
5. Air traffic controllers constantly monitor flights from ...

Exercise 5. Make up your own sentences using the following terms:

controlled flight into terrain, navigational system error, inertial guidance system, flight management system, computerized flight into terrain, crew resource management, ground proximity warning system.

Unit 4. Airport Security

Text 1.

Read and translate the following text into Ukrainian.

Airport Security

Large numbers of people pass through airports. This presents potential targets for terrorism and other forms of crime due to the number of people located in a small area. Similarly, the high concentration of people on large airliners, the potential high death rate with attacks on aircraft, and the ability to use a hijacked airplane as a lethal weapon may provide an alluring target for terrorism.

Airport security attempts to prevent would-be attackers from bringing weapons or bombs into the airport. If they can succeed in this, then the chances of these devices getting on to aircraft are greatly reduced. As such, airport security serves several purposes: To protect the airport from attacks and crime and to protect the aircraft from attack, and to reassure the travelling public that they are safe.

Monte R. Belger of the U.S. Federal Aviation Administration notes "The goal of aviation security is to prevent harm to aircraft, passengers, and crew, as well as support national security and counter-terrorism policy."

While some countries may have an agency that protects all of their airports (such as Australia, where the Australian Federal Police is responsible for security at major airports), in other countries like the United States, the protection is controlled at the state or local level. The primary personnel will vary and can include:

1. A police force hired and dedicated to the airport
2. A branch (substation) of the local police department stationed at the airport
3. Members of the local police department assigned to the airport as their normal patrol area
4. Members of a country's military
5. Members of a country's airport protection service
6. Police dog services for explosive detection, drug detection and other purposes

Other resources may include:

7. Security guards
8. Paramilitary forces
9. Military forces

Some incidents have been the result of travellers being permitted to carry either weapons or items that could be used as weapons on board aircraft so that they could hijack the plane. Travellers are screened by metal detectors. Explosive detection machines used include X-ray machines and explosives trace-detection portal machines (a.k.a. "puffer machines"). Explosive detection machines can also be used for both carry on and checked baggage. These detect volatile compounds given off from explosives using gas chromatography. A recent development is the controversial use of Full body scanners to detect hidden weapons and explosives on passengers. These devices, which use Compton scattering, require that the passenger stand close to a flat panel and produce a high resolution image. There are misunderstandings about how x-ray backscatter personnel scanners function, but they do use ionizing radiation and the x-rays emitted from them penetrate skin as well as clothing. While the risk of cancer from a single backscatter check is probably low, the cumulative risk of repeated exposure to radiation is a threat to public health, especially for people working in the airline industry and frequent travellers. A technology released in Israel in early 2008 allows passengers to pass through metal detectors without removing their shoes, a process required as walk-though gate detectors are not reliable in detecting metal in shoes or on the lower body extremities. Alternately, the passengers step fully shod onto a device which scans in under 1.2 seconds for objects as small as a razor blade.

Generally people are screened through airport security into areas where the exit gates to the aircraft are located. These areas are often called "secure", "sterile" and airside. Passengers are discharged from airliners into the sterile area so that they usually will not have to be re-screened if disembarking from a domestic flight; however they are still subject to search at any time. Airport food outlets have started using plastic glasses and utensils as opposed to glasses made out of glass and utensils made out of metal to reduce the usefulness of such items as weapons.

In the United States non-passengers were once allowed on the concourses to meet arriving friends or relatives at their gates, but this is greatly restricted now in the United States. Non-passengers must obtain a gate pass to enter the secure area of the airport. The most common reasons that a non-passenger may obtain a gate pass is to assist children and the elderly as well as for attending business meetings that take place in the secure area of the airport. In the United States, at least 24 hours' notice is generally required for those planning to attend a business meeting inside the secure

area of the airport. Other countries, such as Australia, do not yet restrict non-travellers from accessing the airside area, however non-travellers are typically subject to the same security scans as travellers.

Sensitive areas in airports, including airport ramps and operational spaces, are restricted from the general public. Called a SIDA (Security Identification Display Area), these spaces require special qualifications to enter.

In some countries, specially trained individuals may engage passengers in a conversation to detect threats rather than solely relying on equipment to find threats. In the United States the TSA has run several dummy tests in several major airports to measure the success of catching people with bombs. In 2002, the TSA reported that roughly 60% of fake bombs or component parts to bombs were missed by covert screeners. In 2007, that percentage rose to 75%, although this increase alone is misleading. The tests are done by using undercover agents to carry fake bombs/parts in their carry-on luggage and counting how many are successful with getting through security checkpoints. The TSA runs covert tests every day and when a screener misses an undercover agent carrying dangerous items, they are immediately sent to remedial training.

Throughout the world, there have been a few dozen airports that have instituted a version of a "trusted traveller program". Proponents argue that security screening can be made more efficient by detecting the people that are threats, and then searching them. They argue that searching trusted, verified individuals should not take the amount of time it does. Critics argue that such programs decrease security by providing an easier path to carry contraband through.

Another critical security measure utilised by several regional and international airports is the use of fibre optic perimeter intrusion detection systems. These security systems allow airport security to locate and detect any intrusion on the airport perimeter, ensuring real-time, immediate intrusion notification that allows security personnel to assess the threat and track movement and engage necessary security procedures.

Exercise 1. Transcribe the following words and word combinations:

Substation, explosive detection, police dogs, military forces, trace-detection, Compton scattering, puffer machines, chromatography, ionizing radiation, sterile, backscatter, re-screened, dummy.

Exercise 2. Answer the questions:

1. What is the main goal of aviation security?
2. What countermeasures are applied to prevent the hijacking of the airplane?
3. What kinds of detectors are used now at the airport to scan people for explosives and how risky could these devices be for human health?
4. What are the areas that are intended for screening people through airport security?
5. What kind of permission must non-passengers obtain to enter the secure area of the airport?
6. What are the sensitive areas in airports that are restricted from the general public?
7. Why can the covert screeners be less effective than some specially trained individuals?
8. What does the TSA do when a screener misses an undercover agent, carrying dangerous items?
9. What kind of program have been instituted in the airports throughout the world and for what purposes?
10. How do the fibre optic perimeter intrusion detection systems work?

Exercise 3. Finish the sentences:

1. Airport security attempts to prevent would-be attackers from …
2. Non-passengers must obtain a gate pass to enter …
3. Another critical security measure utilised by several regional and international airports is the use of …
4. The TSA runs covert tests every day and when a screener misses an undercover agent carrying dangerous items, they are immediately sent to …
5. Explosive detection machines can also be used for …
6. Non-passengers must obtain …
7. Throughout the world, there have been a few dozen airports that have instituted a version of …
8. Some incidents have been the result of …
9. There are misunderstandings about …
10. Critics argue that such programs decrease security by providing…

Exercise 4. Choose the most appropriate translation if any. Explain your choice.

1. Counter-terrorism policy

a) політика контр тероризму;
b) стратегія по боротьби з тероризмом;
c) концепція боротьби з тероризмом.

2. X-ray machine

a) апарат рентгенівського випромінювання;
b) рентгенівська установка;
c) рентгенівська машина.

3. Airport protection service

a) служба охорони безпеки аеропорту;

b) служба безпеки аеропорту;
c) послуги захисту аеропорту.

4. Ionizing radiation

1. випромінювання радіації;
2. іонізуюче випромінювання;
3. випромінювання іонів.

5. Airport ramp

1. рампа аеропорту;
2. стоянка аеропорту;
3. місце стоянки літака.

6. Security personnel

a) персонал охорони;
b) співробітники у галузі безпеки;
c) персонал служби безпеки.

7. Trusted traveler program

a) програма довіри туристам;
b) надійна програма для туристів;
c) програма перевірки подорожуючих.

8. Full body scanner

a) сканер усього тіла;
b) сканер у повний ріст;
c) повномасштабний сканер.

9. Perimeter intrusion detection systems

a) система виявлення вторгнення по периметру;
b) виявлення проникнення у периметральну систему;
c) периметральна система виявлення інтрузії.

10. Paramilitary forces

a) воєнні сили;
b) напіввоєнні формування;
c) воєнізовані сили безпеки.

Exercise 4. Match the word in column A with those in column B in order to make an appropriate word combination, as in the example: *gate pass.*

A	**B**
1. airport	a. scanners
2. walk-through	b. security
3. x-ray	c. detectors
4. full body	d. gate detectors
5. military	e. machines
6. puffer	f. forces
7. national	g. machines
8. metal	h. checkpoints
9. security	i. personnel
10. security	j. food outlets

Exercise 5. Offer all possible ways of translating the following sentences. Comment on the grammatical phenomena present in these sentences.

1. Through a sophisticated analysis of each checked bag, the explosive detection system machines can quickly determine if a bag contains a potential threat or not.

2. The software discards the X-ray-style image that revealed the contours of the traveller's body – the one that left many uncomfortable at the thought of screeners being able to see them with the rough outlines of their undergarments.

3. TSA officials are making the decision to expand on the ability of the software to detect objects and how efficiently it can move travellers through the security checkpoints.

4. Critics have complained that the full-body scans are intrusive.

From *http://www.msnbc.msn.com/*

Exercise 6. Translate the text into English.

У сучасному глобальному суспільстві цивільна авіація є потужною силою прогресу. Кожні декілька секунд 24 години на добу протягом усього року десь на нашій планеті злітає або здійснює посадку літак.

За минулі чотири десятиліття авіаційна безпека стала життєво необхідним фактором у міжнародній цивільній авіації, тому роль навчання в цій області не можна недооцінювати. В зв'язку з тим, що Міжнародна організація цивільної авіації (ІКАО) приділяє особливе значення впровадженню високих стандартів в галузі авіаційної безпеки, виникла потреба в спеціалізованій підготовці персоналу, для чого була створена міжнародна регіональна мережа навчальних центрів з АБ.

В 1998 році був створений Навчальний центр ІКАО з АБ Державного підприємства "Міжнародний аеропорт "Бориспіль". Його історія нерозривно пов'язана з історією розвитку аеропорту "Бориспіль". В 1996 році в структурі служби авіаційної безпеки аеропорту "Бориспіль" був створений Навчальний центр з підготовки персоналу з питань АБ, який вже в 1998 році був інавгурований Президентом Ради ІКАО доктором Ассадом Котайте як Навчальний центр ІКАО з авіаційної безпеки.

За 12-ти річну історію існування, в нашому центрі пройшли навчання фахівці з багатьох країн. Географія говорить сама за себе: Азербайджан, Албанія, Вірменія, Білорусь, Болгарія, Ботсвана, Угорщина, Грузія, Естонія, Казахстан, Киргизстан, Латвія, Литва, Македонія, Молдова, Польща, Росія, Словаччина, Словенія, Туркменістан, Узбекистан, Україна й Хорватія.

From *http://kbp.com.ua*

Exercise 7. Fill in the correct word or word combination (from the box below).

covert tests, full body scanners, sterile areas, security, TSA, x-rays, security checkpoints, backscatter technology

1. They said the _____they use are low energy to ensure they bounce only off skin rather than passing through the body, to produce an image focused on objects concealed beneath clothes.
2. _____take advantage of the fact that at certain wavelengths, electromagnetic waves can pass through clothes but not through the skin, metal or substances such as drugs and explosives.
3. The US _____admits that the scanners have the ability to store and print images.
4. _____of the Transportation Security Administration's screeners and equipment were conducted at hundreds of airports across the country from July to November 2003.
5. According to the report, most failures found at_____were due to a lack of recurrent training for screeners.
6. Our goal is to consistently improve _____, and each day we're building on the already strong system of security we've got in place.
7. _____ displays both organic and inorganic materials hidden on a person's body.
8. "Improvements are needed in the screening process to ensure that dangerous prohibited items are not being carried into the _____of heavily used airports or do not enter the checked baggage system," the report states.

From *http://www.govexec.com/*

Exercise 8. Write the correct form of the word in brackets and complete the sentences.

1. As such, airport security serves several purposes: to protect the airport from attacks and crime and to protect the aircraft from attack, and to reassure the (travel) public that they are safe.
2. A recent development is the (controversy) use of full body scanners to detect hidden weapons and explosives on passengers.
3. There are misunderstandings about how x-ray backscatter personnel scanners function, but they do use (ionize) radiation and the x-rays emitted from them penetrate skin as well as clothing.
4. A (technology) released in Israel in early 2008 allows passengers to pass through metal detectors without removing their shoes.
5. In the United States non-passengers were once allowed on the concourses to meet (arrive) friends or relatives at their gates, but this is greatly restricted now in the United States.

Exercise 9. Say whether the following statements are true or false. Correct false statements.

1. Airport security attempts to prevent would-be attackers from bringing weapons or bombs into the airport.
2. Airport security serves not to protect the airport from attacks and crime.
3. Monte R. Belger of the U.S. TSA notes "The goal of aviation security is to prevent harm to aircraft, passengers, and crew, as well as support national security and counter-terrorism policy."
4. Explosive detection machines are used to detect hidden weapons and explosives on passengers.
5. A technology released in Israel in early 2008 allows passengers to pass through metal detectors without removing their shoes.
6. Generally people are screened through airport security into areas where the entrance gates to the aircraft are located.
7. Non-passengers must obtain a gate blank to enter the secure area of the airport.
8. In 2002, the TSA reported that roughly 60% of fake bombs or component parts to bombs were missed by covert screeners.
9. The TSA runs open tests every day and when a screener misses an undercover agent carrying dangerous items, they are immediately sent to remedial training.
10. Throughout the world, there have been a few dozen airports that have instituted a version of a "trusted traveller program".

Exercise 10. Paraphrase the following sentences using terms from the text.

1. The TSA runs secret testing every day and when a screener misses an undercover agent carrying dangerous items, they are immediately sent to additional studies.
2. Critics argue that such programs decrease security by providing an easier path to smuggle items through.
3. In 2002, the TSA reported that roughly 60% of artificial explosives or component parts to bombs were missed by secret screeners.

4. Police dog services for bomb disclosure, narcotics disclosure and other purposes.

5. Passengers are discharged from airliners into the sterile area so that they usually will not have to be screened a second time if disembarking from a domestic flight.

Exercise 11. Have a look at the following text. It contains a number of mistakes and inaccuracies. Act as a proof-reader and rewrite the sentences in accordance with the rules of style, grammar and word combinability.

What's new in the sky?

The list of items banned or limited by the TSA (Transportation Security Administration) from being carried on airlines includes things you might not think twice about carrying on board but upon which airport security screeners will hone in; sharp weapons are obvious no-no's, but things you may not consider dangerous weapons may be on the list, like spare lithium batteries do note that the lithium ion batteries in your cell phone and laptop are fine).

For instance, pepper spray is a baddie; formerly banned fingernail clippers are now permitted (get a set without an attached metal file). If it can be used as a weapon, it's likely a no go. Some items, like ice picks, are a no-brainer no-no, but know that you must also check the hockey stick and corkscrew. I remembered the hard way in summer 2006 that lighters were banned, although lighters are once again okay as of August 4, 2007 (now that the TSA has deduced that the agency was spending *millions* of dollars and manhours confiscating up to *39,000 lighters a day*).

The TSA-banned items in your carry on can get you fined and even prosecuted, even if you brought 'em accidentally. In scenarios less common now than just after 9/11 airport security crackdowns, you may wind up on a no-fly list or be unable to board if you are carrying a banned item in your carry-on.

From *http://studenttravel.about.com/*

Що нового в небі?

Перелік пунктів, заборонені або обмежені TSA (Transportation Security Administration) від ведуться авіакомпанії включає в себе речі, які ви не могли б думати двічі про проведення на борту, але, на якій огляду безпеки аеропорту буде заточити в; різке зброї очевидні ні-ні, але речі, які ви, можливо, не вважають небезпечною зброєю може бути в списку, як і запасних літієвих батарей не відзначити, що літій-іонні батареї у ваш мобільний телефон і ноутбук чудово).

Так, наприклад, перцевий аерозоль лиходій; раніше заборонили Кліпперс нігтем в даний час дозволяється (отримати безліч без прикріпленого файлу металу). Якщо вона може бути використана в якості зброї, то, швидше за все не йти. Деякі елементи, як лід кирками, які ніякої небезпеки ні-ні, але знаю, що ви повинні також перевірити хокейної ключки і штопор. Я згадав, важкий шлях влітку 2006 року, які були заборонені запальнички, запальнички, хоча ще раз все в порядку станом на 4 серпня 2007 року (тепер, що TSA вивів, що агентство було витрачати мільйони доларів і людино-годин конфіскації до 39000 запальнички день)

TSA-заборонила пунктів у Вашій ручній поклажі на ви можете отримати штраф і навіть судове переслідування, навіть якщо ви принесли 'Em випадково. У сценаріях, рідше, ніж раз після 9 / 11 репресивних заходів безпеки в аеропортах, Ви можете завершити до списку заборонених для польотів або не зможе піднятися на борт, якщо ви несете заборонили пункт у Вашій ручній поклажі.

Exercise 12. Form adjectives from the words provided below.

Use, attack, nation, cancer, hidden, ion, repeat, operation, special, efficient.

Exercise 13. Dialogue.

Imagine the situation, you are an airport security employee and you found out a suspicious item under the clothes of a traveller during the screening procedure. What would be your actions to protect the aircraft from attack? Make dialogues to present this situation using vocabulary from the text.

Exercise 14. Report.

Write a report on airport security. Your report should be brief and contain some information about the main checkpoints of the airport, passenger screening procedures at airports, some TSA restrictions, you can also mention common types of items prohibited or restricted in airports and airplanes. You can care to get some pictures to make your report more interesting. Remember that you should not read your report but be ready to present it to the audience.

Text 2.

Read and translate the following text.

Prior to the 1970s American airports had minimal security arrangements to prevent aircraft hijackings. Measures were introduced starting in the late 1960s after several high-profile hijackings.

Sky marshals were introduced in 1970, but there were insufficient numbers to protect every flight and hijackings continued to take place. Consequently in late 1972, the Federal Aviation Administration required that all airlines begin screening passengers and their carry-on baggage by January 5, 1973. Although an airline would control the operation of a checkpoint, oversight authority was held by the FAA. C.F.R. Title 14 restrictions did not permit a relevant airport authority to exercise any oversight over checkpoint operations.

The September 11 attacks prompted even tougher regulations, such as limiting the number of and types of items passengers could carry on board aircraft and requiring increased screening for passengers who fail to present a government issued photo ID.

The Aviation and Transportation Security Act generally required that by November 19, 2002 all passenger screening must be conducted by Federal employees. As a result, passenger and baggage screening is now provided by the Transportation Security Administration (TSA), part of the Department of Homeland Security. Provisions to improve the technology for detecting explosives were included in the Terrorism Prevention Act of 2004.

Noticing the demand for new technology in airport security, General Electric (GE) started to develop the Secure Registered Traveller System. The new system would use newly developed technology such as automated carry-on scanning, automatic biological pathogen detection, millimeter-wave full body scanning and a quadruple resonance carpet that would detect threats in shoes without having to take them off. The SRT program also works with smartcard technology along with fingerprint technology to help verify passengers. The fingerprint scanner also detects for explosive material traces on the person's fingers.

With the increase in security screening, some airports saw long queues for security checks. To alleviate this, airports created Premium lines for passengers traveling in First or Business Class, or those who were elite members of a particular airline's Frequent Flyer program.

The "screening passengers by observation techniques" (SPOT) program is operating at some U.S. Airports.

From *Wiki*

Exercise 1. Answer the questions:

1. When were the measures introduced in the USA to prevent aircraft hijackings?
2. When were sky marshals introduced?
3. Who required that all airlines begin screening passengers and their carry-on baggage by January 5, 1973?
4. What event prompted regulations, such as limiting the number of and types of items passengers could carry on board aircraft and requiring increased screening for passengers who fail to present a government issued photo ID?
5. Who provides passenger and baggage screening now?
6. What does GE stand for?
7. What are the advantages of the Secure Registered Traveller System?
8. What do airports undertake to alleviate long queues for security checks?

Exercise 2. Say whether the following statements are true or false. Correct false statements.

1. Prior to the 1970s American airports had maximal security arrangements to prevent aircraft hijackings.
2. Sky marshals were introduced in 1970, there were sufficient numbers to protect every flight and hijackings continued to take place.
3. Title 14 restrictions did not permit a relevant airport authority to exercise any oversight over checkpoint operations.
4. The Aviation and Transportation Security Act generally required that by November 19, 2002 all passenger screening must not be conducted by Federal employees.
5. Passenger and baggage screening is now provided by the Transportation Security Administration (TSA), part of the Department of Homeland Security.
6. Provisions to improve the technology for detecting explosives were included in the Terrorism Prevention Act of 2004.
7. With the increase in security screening, some airports saw long queues for security checks.
8. The "screening passengers by observation techniques" (SPOT) program is operating at some U.S. Airports.

Exercise 3. Paraphrase the following sentences.

1. Sky marshals were introduced in 1970, but there were insufficient numbers to protect every flight and hijackings continued to take place.
2. The Aviation and Transportation Security Act generally required that by November 19, 2002 all passenger screening must be conducted by Federal employees.
3. The SRT program also works with smartcard technology along with fingerprint technology to help verify passengers.
4. Noticing the demand for new technology in airport security, General Electric (GE) started to develop the Secure Registered Traveller System.
5. To alleviate this, airports created Premium lines for passengers traveling in First or Business Class, or those who were elite members of a particular airline's Frequent Flyer program.

Exercise 4. Finish the sentences.

1. Noticing the demand for new technology in airport security, General Electric (GE) started to develop ...
2. The SRT program also works with smartcard technology along with fingerprint technology to help ...
3. Prior to the 1970s American airports had minimal security arrangements to prevent ...
4. With the increase in security screening, some airports saw long queues for security ...
5. ... were introduced in 1970, but there were insufficient numbers to protect every flight and hijackings continued to take place.

Exercise 5. Make up your own sentences using the following terms:

aircraft hijacking, terrorism prevention, automated carry-on scanning, biological pathogen detection, millimeter-wave full body scanning, quadruple resonance carpet, smartcard technology, fingerprint scanner.

Text 3.

Read and translate the following text.

All restrictions involving airport security are determined by Transport Canada and are enforced by the Canadian Air Transport Security Authority (CATSA). Since the September 11, 2001 attacks, as well as the Air India bombing in 1985 and other incidents, airport security has tightened in Canada in order to prevent any attacks in Canadian Airspace.

CATSA uses x-ray machines to verify the contents of all carry-ons as well as metal detectors, explosive trace detection (ETD) equipment and random physical searches of passengers at the pre-board screening points. All checked baggage is always x-rayed at all major commercial airports.

CATSA also completed the first phase of its Restricted Area Identity Credential (RAIC) program in January 2007. This program replaces the old Airport Restricted Area Passes issued to airport employees after security checks by the Canadian Security Intelligence Service, the Royal Canadian Mounted Police (RCMP) and Transport Canada with new cards (issued after the same checks are conducted) that contain biometric information (fingerprints and iris scans) belonging to the person issued the RAIC.

While CATSA is responsible for pre-board passenger and random non-passenger screening, they contract out to third-party "service providers" such as Aeroguard and Garda to train, manage and employ the screening officers. In addition, individual airport authorities which were privatized in the 1990s by the Canadian Government are responsible for general airport security rather than CATSA and normally contract out to private companies and in the case of large airports, pay for a small contingent of local police officers to remain on site as well.

Safety and security at Canada's airports are provided by local police forces.

Exercise 1. Answer the questions:

1. Who determines all restrictions involving airport security?
2. What does CATSA use to verify the contents of all carry-ons?
3. When was the first phase of the Restricted Area Identity Credential (RAIC) program completed?
4. What devices are used in airport to provide security?
5. Is CATSA responsible for pre-board passenger and random non-passenger screening?

Exercise 2. Say whether the following statements are true or false. Correct false statements.

1. CATSA uses x-ray machines to verify the contents of all carry-ons as well as metal detectors, explosive trace detection (ETD) equipment and random physical searches of passengers at the pre-board screening points.
2. Since the September 11, 2001 attacks, as well as the Air India bombing in 1985 and other incidents, airport security has tightened in Canada in order to prevent any attacks in Canadian Airspace.
3. X-ray machines, CTX machines, high-resolution x-rays and ETDs are not used to scan checked bags.
4. CATSA uses x-ray machines to verify the contents of all carry-ons as well as metal detectors, explosive trace detection (ETD) equipment and random physical searches of passengers at the pre-board screening points.
5. CATSA also completed the first phase of its Restricted Area Identity Credential (RAIC) program in January 20011.

Exercise 3. Paraphrase the following sentences.

1. All restrictions involving airport security are determined by Transport Canada and are enforced by the Canadian Air Transport Security Authority (CATSA).
2. Airport security has tightened in Canada in order to prevent any attacks in Canadian Airspace.
3. In addition, individual airport authorities which were privatized in the 1990s by the Canadian Government are responsible for general airport security.
4. CATSA uses x-ray machines to verify the contents of all carry-ons as well as metal detectors, explosive trace detection (ETD) equipment and random physical searches of passengers at the pre-board screening points. X-ray machines, All checked baggage is always x-rayed at all major commercial airports.
5. This program replaces the old Airport Restricted Area Passes issued to airport employees after security checks by the Canadian Security Intelligence Service.

Exercise 4. Finish the sentences.

1. CATSA is responsible ...
2. All restrictions involving airport security are determined by ...
3. All restrictions involving airport security are enforced by ...
4. All checked baggage is always x-rayed at all major ...
5. Safety and security at Canada's airports are provided by ...

Exercise 5. Make up your own sentences using the following terms:

explosive trace detection equipment, physical searches of passengers, pre-board screening points, x-ray machines, biometric information.

Text 4.

Read and translate the following text.

Most walk-through detectors are manufactured for personal search of air passengers, but are often used for search of packages, personal belongings and luggage. The operational principle of such detectors may be defined as "Active field" technology. However, unlike the metal detectors of past years, modern designs feature many advancements which completely alter the characteristics of earlier years. The design 500 processes persons only in single direction.

The Exit Sensor System of walk-through detectors performs the following two important operations: deactivates the detector into a non-usage operational condition so that signals from nearby activity or ambient emission will not cause false alarm cycling during such non-use period and activates Evaluation Display for the just-processed suspect. During the second operation Operator's Viewer illuminates green-color "Clear", or red-color "Alarm". On special designs, an optional amber-color "Advisory" may be activated.

Should a suspect fail to proceed though the detector in a normal manner, interruptions in the electronic cycling can be expected. The detector anticipates a normal processing cycle of approximately three seconds per suspect and will automatically recycle itself in about twelve seconds. The recycling will occur if the suspect stops or delays overlong within the detector, or turns back and exits through the entry end.

Exercise 1. Answer the following questions.

1. What are walk-through detectors manufactured for?
2. How can we define the operational principle of such detectors?
3. What functions does the Exit Sensor System of walk-through detectors perform?
4. What does red colour mean?
5. What is the normal processing cycle of the detector?

Exercise 2. Say whether the following statements are true or false. Correct false statements.

1. Most walk-through detectors are manufactured for personal search of air passengers, but are often used for search of packages, personal belonings and luggage.
2. The operational principle of such detectors may be defined as "Passive field" technology.
3. However, unlike the metal detectors of past years, modern designs feature many advancements which completely alter the characteristics of earlier years. The design 500 processes persons only in single direction.
4. The Exit Sensor System of walk-through detectors performs the following three important operations.
5. Should a suspect fail to proceed though the detector in a normal manner, interruptions in the electronic cycling can be expected.

Exercise 3. Paraphrase the following sentences.

1. However, unlike the metal detectors of past years, modern designs feature many advancements which completely alter the characteristics of earlier years.
2. The detector anticipates a normal processing cycle of approximately three seconds per suspect and will automatically recycle itself in about twelve seconds.
3. The design 500 processes persons only in single direction.
4. Should a suspect fail to proceed though the detector in a normal manner, interruptions in the electronic cycling can be expected.
5. The recycling will occur if the suspect stops or delays overlong within the detector, or turns back and exits through the entry end.

Exercise 4. Finish the sentences.

1. Most walk-through detectors are manufactured for ...
2. The operational principle of such detectors may be defined as ...
3. The Exit Sensor System of walk-through detectors performs the following two important operations: ...
4. During the second operation Operator's Viewer illuminates ...
5. The recycling will occur if ...

Exercise 5. Make up your own sentences using the following terms:

walk-through detectors, operational principle, Exit Sensor System, recycling, Active field technology, non-use period, suspect, electronic cycling interruptions.

Unit 5. Aviation Impact on Environment

Text 1.

Read and translate the following text into Ukrainian.

Like all human activities involving combustion, most forms of aviation release carbon dioxide (CO_2) into the Earth's atmosphere, contributing to the acceleration of global warming.

In addition to the CO_2 released by most aircraft in flight through the burning of fuels such as Jet-A (turbine aircraft) or Avgas (piston aircraft), the aviation industry also contributes greenhouse gas emissions from ground airport vehicles and those used by passengers and staff to access airports, as well as through emissions generated by

the production of energy used in airport buildings, the manufacture of aircraft and the construction of airport infrastructure.

While the principal greenhouse gas emission from powered aircraft in flight is CO2, other emissions may include nitric oxide and nitrogen dioxide, (together termed oxides of nitrogen or NOx), water vapour and particulates (soot and sulphate particles), sulphur oxides, carbon monoxide (which bonds with oxygen to become CO2 immediately upon release), incompletely burned hydrocarbons, tetra-ethyl lead (piston aircraft only), and radicals such as hydroxyl, depending on the type of aircraft in use.

The contribution of civil aircraft-in-flight to global CO2 emissions has been estimated at around 2%. However, in the case of high-altitude airliners which frequently fly near or in the stratosphere, non-CO2 altitude-sensitive effects may increase the total impact on anthropogenic (man-made) climate change significantly.

Subsonic aircraft-in-flight contribute to climate change in four ways:

Carbon dioxide (CO2): CO2 emissions from aircraft-in-flight are the most significant and best understood element of aviation's total contribution to climate change. The level and effects of CO2 emissions are currently believed to be broadly the same regardless of altitude (i.e. they have the same atmospheric effects as ground based emissions). In 1992, emissions of CO2 from aircraft were estimated at around 2% of all such anthropogenic emissions, though CO2 concentration attributable to aviation in 1992 was around 1% of the total anthropogenic increase, because emissions occurred only in the last 50 years.

Oxides of nitrogen (NOx): At the high altitudes flown by large jet airliners around the tropopause, emissions of NOx are particularly effective in forming ozone (O3) in the upper troposphere. High altitude (8-13km) NOx emissions result in greater concentrations of O3 than surface NOx emissions, and these in turn have a greater global warming effect. The effect of O3 concentrations are regional and local (as opposed to CO2 emissions, which are global).

NOx emissions also reduce ambient levels of methane, another greenhouse gas, resulting in a climate cooling effect. But this effect does not offset the O3 forming effect of NOx emissions. It is now believed that aircraft sulphur and water emissions in the stratosphere tend to deplete O3, partially offsetting the NOx-induced O3 increases. These effects have not been quantified. This problem does not apply to aircraft that fly lower in the troposphere, such as light aircraft or many commuter aircraft.

Water vapor (H2O): One of the products of burning hydrocarbons in oxygen is water vapour, a greenhouse gas. Water vapour produced by aircraft engines at high altitude, under certain atmospheric conditions, condenses into droplets to form Condensation trails, or contrails. Contrails are visible line clouds that form in cold, humid atmospheres and are thought to have a global warming effect (though one less significant than either CO2 emissions or NOx induced effects) SPM-2. Contrails are extremely rare from lower-altitude aircraft, or from propeller aircraft or rotorcraft.

Cirrus clouds have been observed to develop after the persistent formation of contrails and have been found to have a global warming effect over-and-above that of contrail formation alone. There is a degree of scientific uncertainty about the contribution of contrail and cirrus cloud formation to global warming and attempts to estimate aviation's overall climate change contribution do not tend to include its effects on cirrus cloud enhancement.

Particulates: Least significant is the release of soot and sulfate particles. Soot absorbs heat and has a warming effect; sulfate particles reflect radiation and have a small cooling effect. In addition, they can influence the formation and properties of clouds. All aircraft powered by combustion will release some amount of soot.

Emissions of passenger aircraft per passenger kilometre vary extensively, according to variables such as the size of the aircraft, the number of passengers on board, and the altitude and distance of the journey (the practical effect of emissions at high altitudes may be greater than those of emissions at low altitudes).

This is similar to the emissions from a four-seat car with one person on board.

Per passenger kilometre, figures from British Airways suggest carbon dioxide emissions of 0.1 kg for large jet airliners (a figure which does not account for the production of other pollutants or condensation trails).

In attempting to aggregate and quantify the climate impact of aircraft emissions the Intergovernmental Panel on Climate Change (IPCC) has estimated that aviation’s total climate impact is some 2-4 times that of its CO2 emissions alone (excluding the potential impact of cirrus cloud enhancement). This is measured as radiative forcing. While there is uncertainty about the exact level of impact of NOx and water vapour, governments have accepted the broad scientific view that they do have an effect. Accordingly, more recent UK government policy statements have stressed the need for aviation to address its total climate change impacts and not simply the impact of CO2.

The IPCC has estimated that aviation is responsible for around 3.5% of anthropogenic climate change, a figure which includes both CO2 and non-CO2 induced effects. The IPCC has produced scenarios estimating what this figure could be in 2050. The central case estimate is that aviation’s contribution could grow to 5% of the total contribution by 2050 if action is not taken to tackle these emissions, though the highest scenario is 15%. Moreover, if other industries achieve significant cuts in their own greenhouse gas emissions, aviation’s share as a proportion of the remaining emissions could also rise.

Exercise 1. Answer the following questions.

1. What accelerates the global warming?

2. How has the contribution of civil aircraft-in-flight to global CO2 emissions been estimated?
3. Do the levels and effects of CO2 emissions depend on the altitude?
4. What results in the climate cooling effect?
5. What results in the warming effect?
6. Do all aircraft powered by combustion release some amount of soot?
7. What do figures from British Airways suggest?
8. What organisation aggregates and quantifies the climate impact of aircraft emissions?
9. What is the contribution of aviation in anthropogenic climate change now?
10. What will the contribution of aviation in anthropogenic climate change be in the future? (Say 2050).

Exercise 2. Say whether the following statements are true or false. Correct false statements.

1. The contribution of civil aircraft-in-flight to global CO2 emissions has been estimated at around 2%.
2. CO2 emissions from aircraft-in-flight are the most significant and best understood element of aviation's total contribution to climate change.
3. The most significant is the release of soot and sulfate particles.
4. All aircraft powered by combustion will release some amount of soot.
5. Per passenger kilometre, figures from British Airways suggest carbon dioxide emissions of 0.1 kg for large jet airliners (a figure which does not account for the production of other pollutants or condensation trails).
6. The central case estimate is that aviation's contribution could grow to 8% of the total contribution by 2050 if action is not taken to tackle these emissions, though the highest scenario is 35%.
7. The IPCC has estimated that aviation is responsible for around 3.5% of anthropogenic climate change, a figure which includes both CO2 and non-CO2 induced effects.
8. Contrails are extremely rare from lower-altitude aircraft, or from propeller aircraft or rotorcraft.

Exercise 3. Paraphrase the following sentences.

1. In the case of high-altitude airliners which frequently fly near or in the stratosphere, non-CO2 altitude-sensitive effects may increase the total impact on anthropogenic (man-made) climate change significantly.
2. Contrails are visible line clouds that form in cold, humid atmospheres and are thought to have a global warming effect (though one less significant than either CO2 emissions or NOx induced effects) SPM-2.
3. Soot absorbs heat and has a warming effect; sulfate particles reflect radiation and have a small cooling effect.
4. The IPCC has estimated that aviation is responsible for around 3.5% of anthropogenic climate change, a figure which includes both CO2 and non-CO2 induced effects.
5. If other industries achieve significant cuts in their own greenhouse gas emissions, aviation's share as a proportion of the remaining emissions could also rise.

Exercise 4. Finish the sentences.

1. Like all human activities involving combustion, most forms of aviation release carbon dioxide (CO2) into the Earth's atmosphere, contributing to ...
2. The contribution of civil aircraft-in-flight to global CO2 emissions has been estimated at around ...
3. CO2 emissions from aircraft-in-flight are the most significant and best understood element of aviation's total contribution to ...
4. High altitude (8-13km) NOx emissions result in greater concentrations of O3 than surface NOx emissions, and these in turn have a greater ...
5. Contrails are extremely rare from lower-altitude aircraft, or from ...
6. Soot absorbs heat and has a ...
7. Per passenger kilometre, figures from British Airways suggest carbon dioxide emissions of ...
8. Accordingly, more recent UK government policy statements have stressed the need for aviation to address its total climate change impacts and not simply the impact of ...
9. Per passenger kilometre, figures from British Airways suggest carbon dioxide emissions of 0.1 kg for ...
10. Sulfate particles reflect radiation and have a ...

Exercise 5. Make up your own sentences using the following terms:

carbon dioxide (CO2), soot, climate change, sulfate particles, emission, contrails, the Intergovernmental Panel on Climate Change , greenhouse gas, warming/cooling effect.

Exercise 6 Translate in writing the following part of the text and give it to your fellow student for proofreading.

Emissions of passenger aircraft per passenger kilometre vary extensively, according to variables such as the size of the aircraft, the number of passengers on board, and the altitude and distance of the journey (the practical effect of emissions at high altitudes may be greater than those of emissions at low altitudes).

This is similar to the emissions from a four-seat car with one person on board.

Per passenger kilometre, figures from British Airways suggest carbon dioxide emissions of 0.1 kg for large jet airliners (a figure which does not account for the production of other pollutants or condensation trails).

In attempting to aggregate and quantify the climate impact of aircraft emissions the Intergovernmental Panel on Climate Change (IPCC) has estimated that aviation's total climate impact is some 2-4 times that of its CO2 emissions

alone (excluding the potential impact of cirrus cloud enhancement). This is measured as radiative forcing. While there is uncertainty about the exact level of impact of NOx and water vapour, governments have accepted the broad scientific view that they do have an effect. Accordingly, more recent UK government policy statements have stressed the need for aviation to address its total climate change impacts and not simply the impact of CO2.

Exercise 7. Have a look at the following translation. It contains a number of mistakes and inaccuracies. Act as a proof-reader and rewrite the sentences in accordance with the rules of style, grammar and word combinability.

Much of the noise in propeller aircraft comes equally from the propellers and aerodynamics. Helicopter noise is aerodynamically induced noise from the main and tail rotors and mechanically induced noise from the main gearbox and various transmission chains. The mechanical sources produce narrow band high intensity peaks relating to the rotational speed and movement of the moving parts. In computer modelling terms noise from a moving aircraft can be treated as a line source.	Більшість шуму в пропелерному літаку походить однаково з пропелерів та від аеродинаміки. Гелікоптерний шум спричиняється аеродинамикою з основного та хвостового ротора та механічно спричиняється шум з основної коробки передач та різних ланцюгів передач. Механічні джерела виробляють вузькополосні високоінтенсивні піки, що відносяться до ротаціної швидкості та руху рухомих частин. В компютерному моделюванні терміну шуму з рухомого літака може розглядатися як лінійне джерело. Газотурбінний двигун літака відповідальний за більшість шуму літака під час зльоту та набору висоти. Однак з розвитком у зменшенні шуму технологій літальна рама зазвичай більш шумна під час приземлення.
Aircraft Gas Turbine engines (Jet Engines) are responsible for much of the aircraft noise during takeoff and climb. However, with advances in noise reduction technologies – the airframe is typically more noisy during landing.	

Exercise 8. Translate the following text into English.

Вплив на навколишнє середовище літальних апаратів – проявляється у вигляді шуму літальних апаратів й емісії шкідливих речовин з випускними газами двигунів. Найбільший шум на місцевості літальні апарати роблять поблизу аеропортів при виконанні злітно-посадочних операцій. Значний шум на місцевості може створювати допоміжна силова установка літального апарата при її роботі в наземних умовах. Частка авіації в загальному забрудненні атмосфери мала, однак, наприклад, у зоні аеропорту, вона може бути значної. Забруднюючими речовинами є гази, що відробили, двигунів, що містять у невеликих концентраціях оксиди вуглецю, сірки й азоту, незгорілі вуглеводні, сажу й ін. Зниження емісії шкідливих речовин досягається вдосконалюванням камери згоряння й інших вузлів двигуна. Зменшення забруднення повітря забезпечується також поліпшенням методів експлуатації літальних апаратів.

From *http://aviaciya.org.ua/*

Exercise 9. Report.

Write a report on aviation influence on environment. Your report should be brief and contain the most important information on the subject. You can care to get some pictures to make your report more interesting. Remember that you should not read your report but be ready to present it to the audience.

Text 2

Read and translate the following text into Ukrainian.

Modern jet aircraft are significantly more fuel efficient (and thus emit less CO2 in particular) than 30 years ago. Moreover, manufacturers have forecast and are committed to achieving reductions in both CO2 and NOx emissions with each new generation of design of aircraft and engine. Thus, the accelerated introduction of more modern aircraft represents a major opportunity to reduce emissions per passenger kilometre flown.

Other opportunities arise from the optimisation of airline timetables, route networks and flight frequencies to increase load factors (minimise the number of empty seats flown), together with the optimisation of airspace.

Another possible reduction of the climate-change impact is the limitation of cruise altitude of aircraft. This would lead to a significant reduction in high-altitude contrails for a marginal trade-off of increased flight time and an estimated 4% increase in CO2 emissions. Drawbacks of this solution include very limited airspace capacity to do this, especially in Europe and North America and increased fuel burn because jet aircraft are less efficient at lower cruise altitudes.

However, the total number of passenger kilometres is growing at a faster rate than manufacturers can reduce emissions, and at present there is no readily available alternative to burning kerosene. Thus, the growth in the aviation sector is likely to continue to generate an increasing volume of greenhouse gas emissions. However some scientists and companies such as GE Aviation and Virgin Fuels are researching biofuel technology for use in jet aircraft. As part of this test Virgin Atlantic Airways flew a Boeing 747 from London Heathrow Airport to Amsterdam Schiphol Airport on 24 February 2008, with one engine burning a combination of coconut oil and babassu oil. Greenpeace's chief scientist Doug Parr said that the flight was "high-altitude greenwash" and that producing organic oils to make biofuel could lead to deforestation and a large increase in greenhouse gas emissions.

Exercise 1. Answer the following questions.

1. Are modern jet aircraft significantly more fuel efficient (and thus emit less CO2 in particular) than 30 years ago?
2. How can both CO2 and NOx emissions be reduced?
3. What are the drawbacks of the solution?
4. Is there any readily available alternative to burning kerosene?
5. What are the disadvantages of biofuel?

Exercise 2. Say whether the following statements are true or false. Correct false statements.

1. The accelerated introduction of more modern aircraft represents a major opportunity to reduce emissions per passenger kilometre flown.
2. Another possible reduction of the climate-change impact is the limitation of cruise altitude of aircraft.
3. The total number of passenger kilometres is falling at a faster rate than manufacturers can reduce emissions, and at present there is no readily available alternative to burning kerosene.
4. The growth in the aviation sector is unlikely to continue to generate an increasing volume of greenhouse gas emissions.
5. Some scientists and companies such as GE Aviation and Virgin Fuels are researching biofuel technology for use in jet aircraft.

Exercise 3. Paraphrase the following sentences.

1. Modern jet aircraft are significantly more fuel efficient (and thus emit less CO2 in particular) than 30 years ago.
2. The total number of passenger kilometres is growing at a faster rate than manufacturers can reduce emissions, and at present there is no readily available alternative to burning kerosene.
3. The growth in the aviation sector is likely to continue to generate an increasing volume of greenhouse gas emissions.
4. Manufacturers have forecast and are committed to achieving reductions in both CO2 and NOx emissions with each new generation of design of aircraft and engine.
5. However some scientists and companies such as GE Aviation and Virgin Fuels are researching biofuel technology for use in jet aircraft.

Exercise 4. Finish the sentences.

1. The accelerated introduction of more modern aircraft represents a major opportunity to reduce ...
2. Another possible reduction of the climate-change impact is the limitation of ...
3. Some scientists and companies such as GE Aviation and Virgin Fuels are researching biofuel technology for use in ...
4. There is no readily available alternative to burning ...
5. The growth in the aviation sector is likely to continue to generate an increasing volume of ...

Exercise 5. Make up your own sentences using the following terms:

reductions in emissions, optimisation of airline timetables, route networks and flight frequencies, biofuel, organic oil, greenhouse gas emission, deforestation.

Text 3.

Read and translate the following text into Ukrainian.

The majority of the world's aircraft are not large jetliners but smaller piston aircraft, and many are capable of using ethanol as a fuel, with major modifications. While ethanol also releases CO2 during combustion, the plants cultivated to make it draw that same CO2 out of the atmosphere while they are growing, making the fuel closer to climate-change-neutral. The only problem is the US government's choice of using ethanol from corn, since it takes more energy to produce than is returned, it displaces food crops and thus raises the price of food, and causes soil degradation.

While they are not suitable for long-haul or transoceanic flights, turboprop aircraft used for commuter flights bring two significant benefits: they often burn considerably less fuel per passenger mile, and they typically fly at lower altitudes, well inside the tropopause, where there are no concerns about ozone or contrail production.

An alternative method for reducing the environmental impact of aviation is to constrain demand for air travel. The UK study *Predict and Decide - Aviation, climate change and UK policy*, notes that a 10% increase in fares generates a 5% to 15% reduction in demand, and recommends that the British government should manage demand rather than provide for it. This would be accomplished via a strategy that presumes "… against the expansion of UK airport capacity" and constrains demand by the use of economic instruments to price air travel less attractively. A study published by the campaign group Aviation Environment Federation (AEF) concludes that by levying £9 billion of additional taxes, the annual rate of growth in demand in the UK for air travel would be reduced to 2%. The ninth report of the House of Commons Environmental Audit Select Committee, published in July 2006, recommends that the British government rethinks its airport expansion policy and considers ways, particularly via increased taxation, in which future demand can be managed in line with industry performance in achieving fuel efficiencies, so that emissions are not allowed to increase in absolute terms.

Greenhouse gas emissions from fuel consumption in international aviation, in contrast to those from domestic aviation and from energy use by airports, are not assigned under the first round of the Kyoto Protocol, neither are the non-CO2 climate effects. In place of agreement, Governments agreed to work through the International Civil Aviation Organization (ICAO) to limit or reduce emissions and to find a solution to the allocation of emissions from international aviation in time for the second round of Kyoto in 2009 in Copenhagen.

As part of that process the ICAO has endorsed the adoption of an open emissions trading system to meet CO2 emissions reduction objectives. Guidelines for the adoption and implementation of a global scheme are currently being developed, and will be presented to the ICAO Assembly in 2007, although the prospects of a comprehensive inter-governmental agreement on the adoption of such a scheme are uncertain.

Within the European Union, however, the European Commission has resolved to incorporate aviation in the European Union Emissions Trading Scheme (ETS). A new directive has been adopted by the European Parliament in July 2008 and approved by the Council in October 2008. It will enter into force on 1 January 2012.

Exercise 1. Answer the following questions.

1. Can ethanol be used as a fuel?
2. What are the disadvantages of using ethanol as a fuel?
3. What are the two significant benefits brought by the use of turboprop aircraft for commuter flights?
4. What does the ninth report of the House of Commons Environmental Audit Select Committee, published in July 2006, recommend?
5. What is the role of ICAO in this process?

Exercise 2. Say whether the following statements are true or false. Correct false statements.

1. The majority of the world's aircraft are not large jetliners but smaller piston aircraft, and many are capable of using ethanol as a fuel, with major modifications.
2. While ethanol also releases CO2 during combustion, the plants cultivated to make it draw that same CO2 out of the atmosphere while they are growing, making the fuel closer to climate-change-neutral.
3. An alternative method for reducing the environmental impact of aviation is to contain demand for air travel.
4. As part of that process the ICAO has endorsed the adoption of an open emissions trading system to meet CO2 emissions reduction objectives.
5. Guidelines for the adoption and implementation of a global scheme are currently being developed, and will be presented to the ICAO Assembly in 2011, although the prospects of a comprehensive inter-governmental agreement on the adoption of such a scheme are uncertain.

Exercise 4. Finish the sentences.

1. A study published by the campaign group Aviation Environment Federation (AEF) concludes that by levying £9 billion of additional taxes, the annual rate of growth in demand in the UK for air travel would be reduced to ...
2. Guidelines for the adoption and implementation of a global scheme are currently being ...
3. The only problem is the US government's choice of using ethanol from corn, since it takes more energy to produce than is returned, it displaces food crops and thus raises the price of food, and causes ...
4. An alternative method for reducing the environmental impact of aviation is to constrain demand for ...
5. They often burn considerably less fuel per passenger mile, and they typically fly at lower altitudes, well inside the tropopause, where there are no concerns about ...

Exercise 5. Make up your own sentences using the following terms:

climate-change-neutral fuel, allocation of emissions, emissions trading system, fuel efficiencies, ethanol, long-haul or transoceanic flights, the House of Commons Environmental Audit Select Committee