МОСКОВСКИЙ ГОСУДАРСТВЕННЫЙ
ТЕХНИЧЕСКИЙ УНИВЕРСИТЕТ
ГРАЖДАНСКОЙ АВИАЦИИ

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ИНОСТРАННЫЙ ЯЗЫК

Учебно-методическое пособие
по авиационному английскому языку

для студентов II-III курса
направления 25.03.03
очной формы обучения

Москва
2019

ФЕДЕРАЛЬНОЕ АГЕНТСТВО ВОЗДУШНОГО ТРАНСПОРТА

ФЕДЕРАЛЬНОЕ ГОСУДАРСТВЕННОЕ БЮДЖЕТНОЕ ОБРАЗОВАТЕЛЬНОЕ УЧРЕЖДЕНИЕ ВЫСШЕГО ОБРАЗОВАНИЯ

«МОСКОВСКИЙ ГОСУДАРСТВЕННЫЙ ТЕХНИЧЕСКИЙ УНИВЕРСИТЕТ ГРАЖДАНСКОЙ АВИАЦИИ (МГТУ ГА)»

Кафедра специальной языковой подготовки

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Оглавление

Unit 1 Airports and runways

Exercise 1.

Match the terms with their definitions:

a)

airport	standardized pattern of lights for identifying key locations at an airport at night.
airstrip	An element of signage that marks the available length of the runway
airside area	markings across the runway that denote the beginning and end of the designated space for landing and takeoff under non-emergency conditions
landside area	The runways at the same airport with the same magnetic heading
runway	ATC unit that clears aircraft for takeoff or landing, ensuring that prescribed runway separation will exist at all times.
taxiway	ATC unit responsible for the airport "movement" areas, as well as areas not released to the airlines or other users. This generally includes all taxiways, inactive runways, holding areas, and some transitional aprons or intersections where aircraft arrive, having vacated the runway or departure gate.
apron	A building at an airport where passengers transfer between ground transportation and the facilities that allow them to board and disembark from an aircraft.
airbridge(jetway)	a path for aircraft at an airport connecting runways with aprons, hangars, terminals and other facilities.
terminal building	A defined rectangular area on a land aerodrome prepared for the landing and takeoff of aircraft
control tower	A runway without normal air base or airport facilities.
ATC	Marking on runway that identifies the physical center of the runway and provides alignment guidance during landing and takeoff.
Ground control	The runways that diverge but do not intersect
Tower control	Two or more runways that cross or meet within their lengths.
Approach control	The area accessible to the general public, including those not traveling. It includes check-in and ticketing desks
En-route control	Area accessible to aircraft. Includes runways, taxiways, apron (parking area for aircraft away from terminals) and ramps.

Intersecting runways	an aerodrome with extended facilities, mostly for commercial air transport.
open-v runways	A ramp or tarmac, the area of an airport where aircraft are parked, unloaded or loaded, refueled, or boarded.
parallel runways	an enclosed, movable connector which extends from an airport terminal gate to an airplane
Runway magnetic heading	A tall, windowed structure located on the airport grounds.
Runway pavement marking	A service provided by ground-based employees who direct aircraft on the ground and through controlled airspace, and can provide advisory services to aircraft in non-controlled airspace.
Runway threshold	An air traffic control service in the Terminal Control Area (TMA) and the Control Zone (CTR), which is provided for controlled flights of aircraft arriving at one or more airports under the TMA or departing from them.
Runway centerline	Control performed from control centers called Area Control Centers
Runway distance marker	The direction of the runway with the reference to magnetic North, usually expressed in degrees.
Airport standardized lighting	a variety of pavement signs that provide guidance to pilots operating on the airport surface during arrival and departure

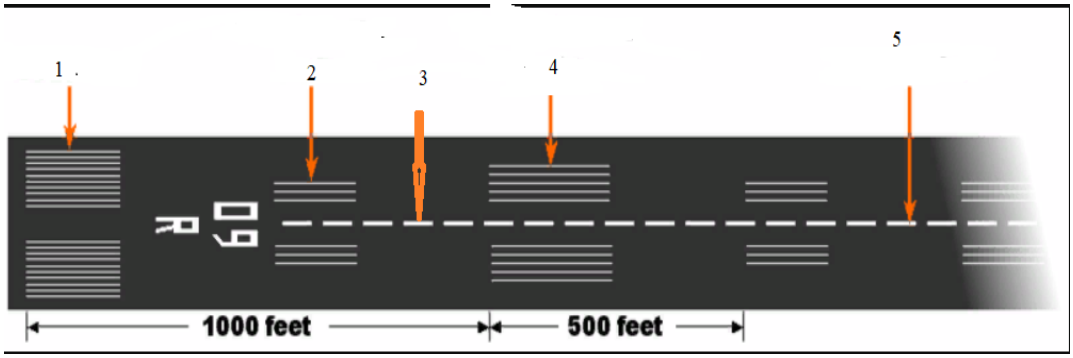
b)

Runway layout	A veer off or overrun off the runway surface
Runway incursion	a unique designation for a transmitter station.
Runway excursion	A lack of understanding (or misunderstanding), non-understanding or misinterpretation of messages in communication. ... This means that English would be used as the language of communication between pilots and ground staff in all countries.
Miscommunication	signs (as of identification, warning, or direction) or a system of such signs
Callsign	A safety device that redirects the high energy exhaust from a jet engine to prevent damage and injury.
hotspot	A location on an aerodrome movement area with a history or potential risk of collision or runway incursion, and where heightened attention by pilots/drivers is necessary.

signage	Any occurrence at an aerodrome involving the incorrect presence of an aircraft, vehicle or person on the protected area of a surface designated for the landing and take off of aircraft
Blast fence	A configuration or design of a runway(s), where operations on the particular runway(s) being used at a given time are mutually dependent
Runway Aiming point	The point on the runway where a pilot aims to touch down

Exercise 2

Complete the figure with the terms. Be ready to define the terms.



Aiming point; rwy threshold, distance marker, touchdown zone, rwy centerline.

Exercise 3

Supplementary Reading.

Read the reference materials. Translate the words in the italics.

a) RWY SURFACE MATERIALS

The choice of material used to construct the runway depends on the use and the local ground conditions.

In the biggest airport, you will find long *hard surface type runways* (*asphalt* and *concrete*). In the smallest

airport, you can find only a soft surface type runway (grass and gravel).

The most common surface types are.

- ASP Asphalt
- BIT Bituminous Asphalt or Tarmac
- BRI *Bricks* (no longer in use, covered with Asphalt or Concrete now)
- CLA *Clay*
- COM *Composite*
- CON Concrete

- COP Composite
- COR *Coral (Coral reef structures)*
- GRE *Graded or rolled earth, Grass on graded earth*
- GRS Grass or earth not graded or rolled
- GVL *Gravel*
- ICE Ice
- LAT *Laterite*
- MAC *Macadam*
- PEM Partially Concrete, Asphalt or Bitumen-bound Macadam
- PER *Permanent Surface,* Details unknown
- PSP *Marsden Matting (Derived from Pierced/Perforated Steel Planking*)
- SAN *Sand*
- SMT *Summerfield Tracking*
- SNO Snow
- U Unknown surface

Water runways do not have a type code as they do not have physical markings, and are thus not registered as specific runways.

b) SIGNIFICANT AIR ACCIDENTS CAUSED BY MISCOMMUNICATION

In the technological world of modern air travel, there's a certain irony in the fact that the majority of aviation disasters are caused by human error. And one of the most common forms of error is miscommunication. Even if just one person makes a mistake, the *repercussions* can be catastrophic.

Air travel is arguably one of the safest forms of transportation, but when airplane crashes do happen, because of their nature, they can *take a devastating toll* on human life. Here's our list some air crashes caused by miscommunication.

Avianca Flight 52 (1990)

On January 25, 1990, Avianca Flight 52 was carrying 149 passengers from Bogotá, Colombia to New York. However, because of bad weather conditions and *air traffic congestion,* the Boeing 707 was *forced into a holding pattern* off the coast near New York. And after circling for nearly an hour and a half, the aircraft was *running low on fuel.*

When Flight 52 arrived at Kennedy Airport, due to the fog and wind, only one runway was open for the 33 planes that were attempting to land every hour. What's more, the flight was delayed again as the aircraft ahead of them *failed to touch down*. Flight 52's fuel situation soon became desperate.

Two *crucial pieces of miscommunication* led to the disaster that was to follow. When the aircraft was passed from regional to local air traffic controllers, the local controllers were not informed that the aircraft had too little fuel to reach its alternative airport. *Compounding the problem*, crucially the aircraft's crew did

not explicitly declare that there was "fuel emergency" to the local controllers, which would have indicated that the plane was actually in danger of crashing.
As a result, after missing its first attempt to land, the airplane was given a landing pattern that it had too little fuel to execute. While the crew attempted to maneuver the plane, its engines *flamed out in quick succession*. The Boeing 707 slammed into the village of Cove Neck, Long Island, killing 65 of its 149 passengers and eight out of nine of its crew.

Linate Airport Disaster (2001)

On October 8, 2001, miscommunication played a role in a major collision at Linate Airport in Milan, Italy. The runway was *obscured by thick fog*, effectively reducing visibility to around 656 feet (200 meters), which may also have contributed to the tragedy, together with factors such as high traffic volume.
A Cessna Citation CJ2 business jet was given clearance to taxi to its takeoff point on a route that would avoid the main runway. However, due partly to poor use of radio communications and lack of proper markings and signs, the Cessna misinterpreted the message and turned in the wrong direction, crossing the main runway. Its route led it into the path of Scandinavian Airlines Flight 686, a McDonnell Douglas MD-87 airliner.
The two planes collided, with Flight 686 traveling at about 170 mph (270 kph). The Cessna went up in flames, while the right engine of the MD-87 was destroyed. The pilot of Flight 686, Joakim Gustafsson, managed to get the plane airborne for a brief period. And in an attempt to regain control, he *hit the thrust reverser and brakes* – noted as a particularly skillful maneuver. Even so, Gustafsson lost control of the plane, and it smashed into a luggage hangar at the end of the runway. In total, 118 people were killed in the disaster.

Dan Air Flight 1008 (1980)

This disaster was caused by a single misheard word. Dan Air Flight 1008 departed from Manchester, England, on the morning of April 25, 1980, en route to Tenerife, one of Spain's Canary Islands. At 1:21 pm, the plane *ploughed* into the side of the island's mount La Esperanza, killing all 146 people on board.
The cause of the disaster was a misinterpretation made by the Boeing 727's flight crew. The plane was instructed by the control tower to take an unpublished, not officially approved, and potentially dangerous holding pattern above Los Rodeos Airport. But the pilot also seems to have mistaken the word "inbound" for "outbound" in the instructions he received, flying in the opposite direction to which he was supposed to.
This turn in the wrong direction took the plane through an area of exceptionally high ground. And due to the airport's lack of ground radar, the air traffic controllers were unable to tell the flight crew that the plane was off course.
Heavy clouds obscured the crew's vision, likely preventing them from seeing the *looming threat* of the mountain. The first sign they had of any *impending danger*

was when the plane's ground proximity warning device was triggered. The crew attempted a steep climb, but the aircraft slammed into the mountainside, killing everyone on board instantly.

Tenerife Airport Disaster (1977)

The worst air disaster of all time occurred at Tenerife's Los Rodeos Airport (now known as Tenerife North Airport) in the Canary Islands. Two Boeing 747s, Pan Am Flight 1736 and KLM Royal Dutch Airline Flight 4805, collided in fog, killing 583 people and leaving only 61 survivors. Unfortunately, the causes of the disaster *boil down to possible impatience* and a very basic error of communication.

On March 27, 1977, Los Rodeos Airport was covered in heavy fog and was overcrowded due to traffic being diverted from Gran Caneria Airport, where a bomb had exploded. This may also have meant that direction from air traffic control was more *muddled* than usual.

KLM pilot Jacob van Zanten was eager to leave. Van Zanten and his crew had almost reached the legal limit of their on-duty time and would have to stay in Tenerife overnight unless they got going soon. This may have contributed to the pilot's fatal mistake when he received the communication "you are clear" from the air traffic control tower. One more clearance was required before van Zaten could take off, but instead he began to accelerate down the runway. In the meantime, the Pan Am flight, which was attempting to find its assigned taxiway in the heavy fog, was directly in the KLM airplane's path. The resulting collision obliterated the Dutch plane, sending it some 100 feet into the air before it came crashing down and exploded in a ball of fire. The Pan Am flight was sliced into pieces and also went up in flames.

Exercise 4

Translate the following sentences

1.Водитель грузовика техобслуживания двигался по рулежной дорожке по направлению к аэровокзалу.

2.Большинство оперативных ошибок связаны с неполадками связи.

3.Вылетающие самолеты могут с легкостью пересечь ВПП, если пропустят рулежную дорожку.

4.Когда пилот отвечает на вызов диспетчера, он должен включить свой позывной.

5.Как попасть в здание администрации аэропорта? – Двигайтесь по РД К в юго-восточном направлении, на втором перекрестке сверните налево

6.Прибывающие самолеты должны повернуть налево, чтобы избежать конфликта.

7.Оставаясь на предварительном у ВПП 17, пилот получил разрешение на пересечение, но ВПП оказалась активной.

8.Как попасть на вертолетную площадку? – Двигайтесь по магистральной РД, перед пересечением остановитесь – на ВПП 17 самолет будет разгоняться.
9.В сложных погодных условиях самолет сел на ВПП. Экипаж получил инструкции освобождать ВПП двигаясь к перрону.
10.Диспетчер дал разрешение на взлет.

Exercise 5

Describe the picture

1. What type of picture is it? (a diagram, a photograph, a chart, a poster, an aerial photoshoot)
2. Where does the action of this picture take place? (on the airfield, in the control tower, inside the terminal, in some aerodrome facility)
3. What object(s) can you see in the foreground (background)?
4. What kind of procedure does this picture represent (routine/emergency) Provide arguments to support your decision.
5. Speak about the possible reason for an emergency

Exercise 6

Comment on the following topics. You should speak continuously.

1.RWY incursion: definition, examples, preventive measures
2 RWY layout, RWY configurations, ground markings, signage, lighting
3.Miscommunication: areas, examples, preventive measures, language Requirements

Unit 2 Navigation and flight planning

Exercise 1.

Match the terms with their definitions

a)

Visual flight rules VFR	a global navigation satellite system that provides geolocation and time information to a GPS receiver anywhere on or near the Earth
Instrument flight rules IFR	compass direction in which the craft's bow or nose is pointed
pilotage	a radio navigation technology that measures the slant range (distance) between an aircraft and a ground station by timing the propagation delay of radio signals in the frequency band between 960 and 1215 megahertz (MHz).
Aeronautical chart	a radio transmitter at a known location, used as an aviation or marine navigational aid. As the name implies, the signal transmitted does not include inherent directional information
Dead reckoning	the use of angular measurements (sights) between celestial bodies and the visible horizon to locate one's position in the world, on land as well as at sea.
Heading	type of short-range radio navigation system for aircraft, enabling aircraft with a receiving unit to determine its position and stay on course by receiving radio signals transmitted by a network of fixed ground radio beacons. It uses frequencies in the very high frequency (VHF) band from 108.00 to 117.95 MHz
bearing	a device for finding the direction, or bearing, to a radio source
Navigational aids	an aviation flight category that describes weather conditions that require pilots to fly primarily by reference to instruments, and therefore under instrument flight rules (IFR), rather than by outside visual references under visual flight rules (VFR).
Instrument meteorological conditions	any sort of marker which aids the traveler in navigation, usually nautical or aviation travel. Common types of such aids include lighthouses, buoys, fog signals, and day beacons.
Flight instruments	the horizontal angle between the direction of an object and another object, or between it and that of true north.

Celestial navigation	the instruments in the cockpit of an aircraft that provide the pilot with information about the flight situation of that aircraft, such as altitude, airspeed and direction.
Non-directional beacon	the process of calculating one's current position by using a previously determined position, or fix, and advancing that position based upon known or estimated speeds over elapsed time and course.
Automatic direction finder	a map designed to assist in navigation of aircraft,
Very high frequency omni-directional range	Art of knowing where you are by reading a map and comparing it with the surrounding terrain and landmarks
Distance measuring equipment	a set of regulations under which a pilot operates under conditions in which flight by outside visual reference is not safe, or flight by reference to instruments in the flight deck and navigation is accomplished by reference to electronic signals
Global positioning system	the regulations that specify the cloud and visibility limitations for aircraft operating with visual reference to terrain.

b)

marshland	an enlarged natural or artificial lake, pond or impoundment created using a dam or lock to store water.
harbour	a structure built to span a physical obstacle, such as a body of water, valley, or road, without closing the way underneath.
cemetery	any kind of apparatus constructed for oil drilling.
ridge	a barren area of landscape where little precipitation occurs and, consequently, living conditions are hostile for plant and animal life.
High terrain	A controlled-access highway that is raised above grade for its entire length
Elevated road	a geographical feature consisting of a chain of mountains or hills that form a continuous elevated crest for some distance.
farmland	a place where the remains of dead people are buried or otherwise interred.
desert	low-lying wet land with grassy vegetation; usually is a transition zone between land and water
bridge	A mountainous area

reservoir	land devoted to agriculture, the systematic and controlled use of other forms of life—particularly the rearing of livestock and production of crops—to produce food for humans
mast	a sheltered body of water where ships, boats, and barges can be docked.
Oil rig	tall structure designed to support antennas for telecommunications and broadcasting, including television.

Exercise 2

What do these abbreviations stand for? Define the terms and use them in the sentences of your own.

ATC, GPS, ADF, NDB, VOR, IMC, IFR, VMC, VFR, ETA, nm.

Exercise 3

Supplementary Reading.

Read the reference materials. Translate the words in the italics

Celestial navigation, also known as astronavigation, is the ancient and modern practice of position fixing that enables a navigator to transition through a space without having to rely on estimated calculations, or dead reckoning, to know their position. Celestial navigation uses "sights", or angular measurements taken between a celestial body (e.g. the Sun, the Moon, a planet, or a star) and the visible horizon. The Sun is most commonly used, but navigators can also use the Moon, a planet, Polaris, or one of 57 other navigational stars whose coordinates are *tabulated in the nautical almanac and air almanacs.*

Celestial navigation is the use of angular measurements (sights) between celestial bodies and the visible horizon to locate one's position in the world, on land as well as at sea. At a given time, any celestial body is located directly over one point on the Earth's surface. The *latitude and longitude* of that point is known as the celestial body's geographic position (GP), the location of which can be determined from tables in the nautical or air almanac for that year.

The measured angle between the celestial body and the visible horizon is directly related to the distance between the celestial body's GP and the observer's position. After some computations, referred to as sight reduction, this measurement is used to plot *a line of position (LOP)* on a navigational chart or *plotting work sheet*, the observer's position being somewhere on that line. (The LOP is actually a short segment of a very large circle on Earth that surrounds the GP of the observed celestial body. An observer located anywhere on the circumference of this circle on Earth, measuring the angle of the same celestial body above the horizon at that instant of time, would observe that body to be at the same angle above the horizon.) Sights on two celestial bodies give two such lines on the chart, intersecting at the observer's position (actually, the two circles would result in two points of intersection arising from sights on two stars described above, but

one can be discarded since it will be far from the estimated position—see the figure at example below). Most navigators will use sights of three to five stars, if available, since that will result in only one common intersection and minimizes the chance of error. That premise is the basis for the most commonly used method of celestial navigation, referred to as the 'altitude-intercept method'.

There are several other methods of celestial navigation that will also provide position-finding using sextant observations, such as the noon sight, and the more archaic lunar distance method. Joshua Slocum used the lunar distance method during the first recorded single-handed circumnavigation of the world. Unlike the altitude-intercept method, the noon sight and lunar distance methods do not require accurate knowledge of time. The altitude-intercept method of celestial navigation requires that the observer know exact *Greenwich Mean Time (GMT)* at the moment of his observation of the celestial body, to the second—since for every four seconds that the time source (commonly a chronometer or, in aircraft, an accurate "hack watch") is in error, the position will be off by approximately one nautical mile.

b) FLIGT PLAN

Description of flight plan blocks Domestic Flight Plan Form.

Standard flight plan form

Type: Type of flight plan. Flights may be VFR, IFR, DVFR, or a combination of types, termed composite.

Aircraft Identification: The registration of the aircraft, usually the flight or tail number.

Aircraft Type/Special Equipment: The type of aircraft and how it's equipped. For example, a Mitsubishi Mu-2 equipped with an altitude reporting transponder and GPS would use MU2/G. Equipment codes may be found in the FAA Airman's Information Manual.

True airspeed in knots: The planned cruise true airspeed of the aircraft in knots.

Departure Point: Usually the identifier of the airport from which the aircraft is departing.

Departure Time: Proposed and actual times of departure. Times are Universal Time Coordinated.

Cruising Altitude: The planned cruising altitude or flight level.

Route: Proposed route of flight. The route can be made up of airways, intersections, navaids, or possibly direct.

Destination: Point of intended landing. Typically the identifier of the destination airport.

Estimated Time Enroute: Planned elapsed time between departure and arrival at the destination.

Remarks: Any information the PIC believes is necessary to be provided to ATC. One common remark is "SSNO", which means the PIC is unable or unwilling to

accept a SID or STAR on an IFR flight.
Fuel on Board: The amount of fuel on board the aircraft, in hours and minutes of flight time.
Alternate Airports: Airports of intended landing as an alternate of the destination airport. May be required for an IFR flight plan if poor weather is forecast at the planned destination.
Pilot's Information: Contact information of the pilot for search and rescue purposes.
Number Onboard: Total number of people on board the aircraft.
Color of Aircraft: The color helps identify the aircraft to search and rescue personnel.
Contact Information at Destination: Having a means of contacting the pilot is useful for tracking down an aircraft that has failed to close its flight plan and is possibly overdue or in distress

c)
Jay Prochnow, a retired US Navy pilot, was delivering a Cessna 188 from the United States to Australia. Prochnow had a colleague who was flying another Cessna 188 alongside him. The long trip would be completed in four stages. On the morning of 20 December, both pilots took off from Pago Pago. His colleague crashed on take off but was unharmed. Prochnow landed and set out the following day to Norfolk Island.
When Prochnow arrived at the region where he believed Norfolk Island was, he was unable to see the island. He informed Air Traffic Control (AATC), but at this point, there was no immediate danger. He continued searching; after locating more homing beacons from other islands, he realized his automatic direction finder had malfunctioned and he was now lost somewhere over the Pacific Ocean. He alerted AATC and declared an emergency.

There was only one aircraft in the vicinity, Air New Zealand Flight 103, a McDonnell Douglas DC-10 travelling from Fiji to Auckland. The flight had 88 passengers on board. The captain was Gordon Vette, the first officer was Arthur Dovey, and the flight engineer was Gordon Brooks. Vette knew that if they did not try and help, Prochnow would almost certainly die. Vette was a navigator, and at the time of the incident, he still held his license. Furthermore, another passenger, Malcolm Forsyth, was also a navigator; when he heard about the situation he volunteered to help. As neither Prochnow nor the crew of the DC-10 had any real idea of where the Cessna was, the crew had to devise creative ways to find it. By this time, contact between both aircraft had been made on long-range HF radio. Prochnow had crossed the *international date line*, and the date was now 22 December. Vette was able to use the setting sun to gain an approximate position of the Cessna. He instructed the Cessna to point directly at the setting sun. He did the same and noted the difference in heading between the

aircraft as four degrees. After making an allowance for the different altitudes of the aircraft, the difference in sunset times between the aircraft and Norfolk Island was also noted. This data allowed the crew to calculate that the Cessna must be southwest of the DC-10 by about 400 nautical miles. About 25 minutes after turning in that direction, contact on short-range VHF radio was established. This had a range of 200 nautical miles. It was hoped the DC-10 would be making a vapour trail to make it more visible. After contacting Auckland it was determined that weather conditions were not suitable for a trail. Brooks knew that by dumping fuel they could produce a vapour trail. As the search was getting more and more desperate, they decided to try it. Prochnow did not see the *trail,* and it was starting to get dark. Vette wanted all the passengers to be involved, so he asked them to look out of the windows and invited small groups to come to the cockpit.

As it got darker and darker, Prochnow considered *ditching*, but Vette did not want to give up. So they also used a technique known as *"aural boxing*" to try to pinpoint the small plane; this took over an hour to complete. Once it had been done, they had a much better *approximation* of Prochnow's position. The DC-10 used its strobe lights to try to make itself more visible to the Cessna. It took some time, but eventually, Prochnow reported seeing light. This was not the DC-10, it was an oil rig, and Prochnow went towards it. This was identified as Penrod, which was being towed from New Zealand to Singapore. This gave Prochnow's exact position. After some confusion about the exact position of the Penrod, it was finally established that the estimates of the crew of the DC-10 were very accurate. Prochnow was able to make it to Norfolk Island with his remaining fuel. He touched down on Norfolk Island after being in the air for twenty-three hours and five minutes.

Exercise 4

Translate the following sentences

1.Самолет с 240 пассажирами на борту, направлявшийся в Хитроу выполнил аварийную посадку из-за отказа топливной системы.

2.Пилоты ПВП объявили о ЧС на борту после того, как не обнаружили контрольную точку.

3.Вы можете попасть в зону хорошей видимости?

4.Командир коммерческого авиалайнера принял сигнал бедствия.

5.Над гаванью развернитесь на 180 градусов и летите прямо до связной вышки, 30 градусов справа от Вас будет жилой массив, а за ним- аэродром.

6.Самолет был оборудован только прокладчиком пути для приема высокочастотных сигналов от ненаправленных радиомаяков.

7.Чтобы помочь пилоту ПВП, командир развернул самолет и установил местоположение легкого самолета, используя радиосигнал.

8.Подтвердите, что болото теперь за Вами.

9.Вы видите нефтяную вышку прямо перед Вами?
10.Сигнал бедствия принял, доложите запас топлива и количество человек на борту.

Exercise 5
Describe the picture

1. What type of picture is it? (a diagram, a photograph, a chart, a video game screen shot, an aerial photoshoot)
2. Where does the action of this picture take place? (types of terrain)
3. What is the position of the photographer?
4. What type of flight is it? (IFR/VFR, commercial/general, training/crop-duster)? Prove your choice.
5. What will happen next?

Exercise 6
Comment on the following topics. You should speak continuously

1.VFR navigation: pilotage, dead reckoning, celestial navigation
2.IFR navigation, the evolution of navigational aids
3.Flight planning

Unit 3 Aviation technology

Exercise 1.
Match the terms with their definitions
a)

Flight control system	a system that replaces the conventional manual flight controls of an aircraft with an electronic interface.
yaw	is the situation in which it is decided to reject the takeoff of an airplane
pitch	mechanical devices consisting of multiple wires or strands, helically wound or laid about an axis.
roll	Atc vectors to provide lateral and longitudinal separation,spacing
Fly-by-wire	a device that moves fluids (liquids or gases), or sometimes slurries, by mechanical action
Flight envelope	flight phase that occurs when the aircraft levels after a climb to a set altitude and before it begins to descend.
Maiden flight	a circular (clockwise or anticlockwise) movement of the body as it moves forward
datalink	a device that regulates, directs or controls the flow of a fluid by opening, closing, or partially obstructing various passageways.
Cruise flight	The new aircraft first flight
Abort take-off	a long, thin metal or wooden bar
cable	component of a machine that is responsible for moving and controlling a mechanism or system, for example by opening a valve.
Avoidance instructions	capabilities of a design in terms of airspeed and load factor or altitude. Can also refer to other measurements such as manoeuvrability
actuator	nose up or tail up
rod	system for the transmission of messages between aircraft and ground stations, which has been in use since 1978
pump	a movement around the vertical axis of a rigid body that changes the direction it is pointing, to the left or right of its direction of motion.
pulley	It consists of flight control surfaces, the respective cockpit controls, connecting linkages, and the necessary operating mechanisms to control an aircraft's direction in flight. Aircraft engine controls are also considered as flight controls as they change speed.

valve	a wheel on an axle or shaft that is designed to support movement and change of direction of a taut cable or belt

b)

congestion	a flight recorder used to record the audio environment in the flight deck of an aircraft for the purpose of investigation of accidents and incidents.
Cockpit Voice Recorder	an electronic information management device that helps flight crews perform flight management tasks more easily and efficiently with less paper.
Traffic Collision Avoidance System	To prevail or have dominance over; have final authority or say over; overrule
Flight Data Recorder	a system on Airbus aircraft for monitoring and displaying engine and aircraft system information to the pilots. In the event of a malfunction, it will display the fault and may also display the appropriate steps of the remedial action.
Electronic Flight Bag	to shut down and restart (a computer or program).
To override	a test of the performance, qualities, or suitability of someone or something
Electronic Centralized Aircraft Monitor	system which ensures the comfort and safety of crew and passengers by controlling the cabin pressure and the exchange of air from the inside of the aircraft to the outside
To reboot	an electronic recording device placed in an aircraft for the purpose of facilitating the investigation of aviation accidents and incidents.
trial	a system designed to reduce the incidence of mid-air collisions between aircraft.
Pressurization system	a condition on transport that as use increases, and is characterized by slower speeds, longer trip times, and increased vehicular queueing.

Exercise 2

What do these abbreviations stand for? Define the terms and use them in the sentences of your own.

ACARS, EICAS, ECAM, EFB, FDR, CVR, PFD.

Exercise 3

Supplementary Reading. Read the reference materials. Translate the words in the italics

a)
The Airbus uses a side stick and has a fly by wire control system that does not return any *mechanical, synthetic or otherwise feedback to the side stick*. The side stick commands a flight control computer and is governed by a flight envelope defined by the air data the computer receives from the *aircrafts sensors*.
The main difference is that when an Airbus is maneuvered the pilot is djusting the aircraft trajectory and without intervention will maintain it as the fly by wire system trims the aircraft to maintain attitude until another adjustment is commanded. The pilots are essentially flying a computer.
With the controls being mediated by a computer the system allows protections and limits to be implemented to prevent the aircraft *exceeding is flight envelope and being put into a dangerous predicament*.
The advantages of this are a *reduced workload* for the pilots under manual flying conditions, flight deck commonality for a single type rating, a more comfortable under some circumstances and the protection of the flight envelope under normal control laws.
The disadvantage of Airbus FBW is the dependence on air data computers to provide reliable information to the flight control system such in the case of AF447 and QF72 where things have gone bad and the fact that the autopilot is engaged doesn't matter.
Boeing uses a control column in all aircraft and most of them have a *mechanical link* between the column and the control surfaces. The fly by wire Boeings have synthetic feedback from the control surfaces and have a 'feel' to them like their *hydraulic counterparts*.
The Boeing FBW system provides flight envelope protection and *asymmetric thrust compensation* but will not *autotrim the aircraft*. Essentially keeping all of the *handling characteristics* of a conventional control system without the weight of the hydraulic lines and the increased safety of the envelope protections.
The disadvantages would be the *lack of redundancy* that you have with 3 independent hydraulics systems and the potential *cascade of system degradation* and *erroneous warnings* as a result of a *failed sensor*.
b)
A HUD - Head Up Display - is a means of presenting information to the pilot in the line of their external forward vision which projects key flight instrument data onto a small *'see-through'* screen positioned just in front of the pilot line of sight looking ahead out of the aircraft.
First *collimators* and now holographic technology makes the image on the screen appear to be far out in front of the aircraft so that the pilot does not have to change eye focus to view a screen which may only be 20cm away. The principle benefit of this has been seen as easing, in both directions, the transition between control of the aircraft by reference to the instrument panel

and by reference to external *cues*. It also neatly facilitates a combination of these sources for single pilot operations.

Not surprisingly, military applications have led the way but following the introduction of the first civil HUD application in 1993, both general aviation and airline applications have been are growing and nowadays, all of the latest multi crew aircraft types have HUD system options. HUD on multi crew civil aircraft has been limited to single-side installation with only the Boeing C-17 and Lockheed C130J military transports having completely independent dual installations. Now, however, customer demand has driven the development of a dual LCD head-up guidance system for the Embraer 190. All the major avionic manufacturers who originally developed equipment for the military market are now also supplying the civil market. There are some alternative names for a HUD, including VGS - Visual Guidance System, HGS - Head Up Guidance System, and HFDS - Head-up Flight Display System.

HUD system components

A computer to receive aircraft data and generate display symbology.

An overhead unit to mount the cathode ray tube (CRT) which projects the assembled image onto the transparent display screen in front of the pilot.

The transparent display screen - called a combiner - which is a ‘holographic optical element’ made of glass or plastic that reflects the projected image towards the pilot’s eyes without interfering with the passage of ambient light.

A control panel to allow selection by the pilot of various display options and to enter data not received and integrated by the computer from aircraft sensors.

An *annunciator pane*l to provide HUD status and warning information.

Potential Difficulties with HUDS

Two key problems have been routinely identified with HUD use which are important to address during the specific flight crew training necessary for its use:

attention capture, also known as *tunneling*, in which pilots can become focused on the HUD display to the exclusion of adequate reference to events or information outside the aircraft

critical information in the outside-aircraft scene is obscured by display imagery; the design solution for this is to keep the quantity of symbols low enough to *avoid clutter.* Reducing clutter can also help with attention capture.

c)

A glass cockpit is an aircraft cockpit that features electronic (digital) flight instrument displays, typically large LCD screens, rather than the traditional style of analog dials and *gauges.* While a traditional cockpit (nicknamed a "steam cockpit" within aviation circles) relies on numerous mechanical gauges to display information, a glass cockpit uses several displays driven by flight management systems, that can be adjusted (multi-function display) to display flight information as needed. This simplifies aircraft operation and navigation

and allows pilots to focus only on the most pertinent information. They are also popular with airline companies as they usually eliminate the need for a flight engineer, saving costs. In recent years the technology has also become widely available in small aircraft.

As aircraft displays have modernized, the sensors that feed them have modernized as well. Traditional gyroscopic flight instruments have been replaced by *electronic attitude and heading reference systems* (AHRS) and air data computers (ADCs), improving reliability and reducing cost and maintenance. GPS receivers are usually integrated into glass cockpits.

Early glass cockpits, found in the McDonnell Douglas MD-80/90, Boeing 737 Classic, 757 and 767-200/-300, ATR 42, ATR 72 and in the Airbus A300-600 and A310, used Electronic Flight Instrument Systems (EFIS) to display attitude and navigational information only, with traditional mechanical gauges retained for airspeed, altitude, vertical speed, and engine performance. Later glass cockpits, found in the Boeing 737NG, 747-400, 767-400, 777, A320 and later Airbuses, Ilyushin Il-96 and Tupolev Tu-204 have completely replaced the mechanical gauges and warning lights in previous generations of aircraft. While glass cockpit-equipped aircraft throughout the late 20th century still retained analog altimeters, attitude, and airspeed indicators as standby instruments in case the EFIS displays failed, more modern aircraft have been increasingly been using digital standby instruments as well, such as the integrated standby instrument system.

Unlike the previous era of glass cockpits—where designers merely copied the look and feel of conventional electromechanical instruments onto *cathode ray tubes*—the new displays represent a true departure. They look and behave very similarly to other computers, with windows and data that can be manipulated with *point-and-click devices*. They also add terrain, approach charts, weather, vertical displays, and 3D navigation images.

The improved concepts enable aircraft makers to customize cockpits to a greater degree than previously. All of the manufacturers involved have chosen to do so in one way or another—such as using a *trackball, thumb pad or joystick* as a pilot-input device in a computer-style environment. Many of the modifications offered by the aircraft manufacturers improve situational awareness and customize the human-machine interface to increase safety.

Modern glass cockpits might include *Synthetic Vision* (SVS) or Enhanced Vision systems (EVS). Synthetic Vision systems display a realistic 3D depiction of the outside world (similar to a flight simulator), based on a database of terrain and geophysical features *in conjunction with* the attitude and position information gathered from the aircraft navigational systems. Enhanced Vision systems add real-time information from external sensors, such as an *infrared camera*.

Exercise 4

Translate the following sentences

1.Система обмена текстовыми сообщениями допускает не только шаблонные сообщения для экстренных ситуаций.

2.Иногда последовательность сообщений нарушается, это может привести к недопониманию.

3.Пилоты попробовали перегрузить систему после полного отключения всех приборов самолета.

4.Многие пилоты предпочитают пользоваться электронной системой бортовой документации для организации полетов.

5.Система обмена текстовыми сообщениями уменьшила загруженность аэровоздушного пространства, многие диспетчеры считают, что она облегчила связь.

6.На гражданских самолетах в пилотских кабинах расположен датчик голосового самописца для записи переговоров экипажа.

7..На самолетах Airbus, например, бортовой компьютер на дает набирать высоту с углом более 30 градусов, чтобы не допустить сваливание.

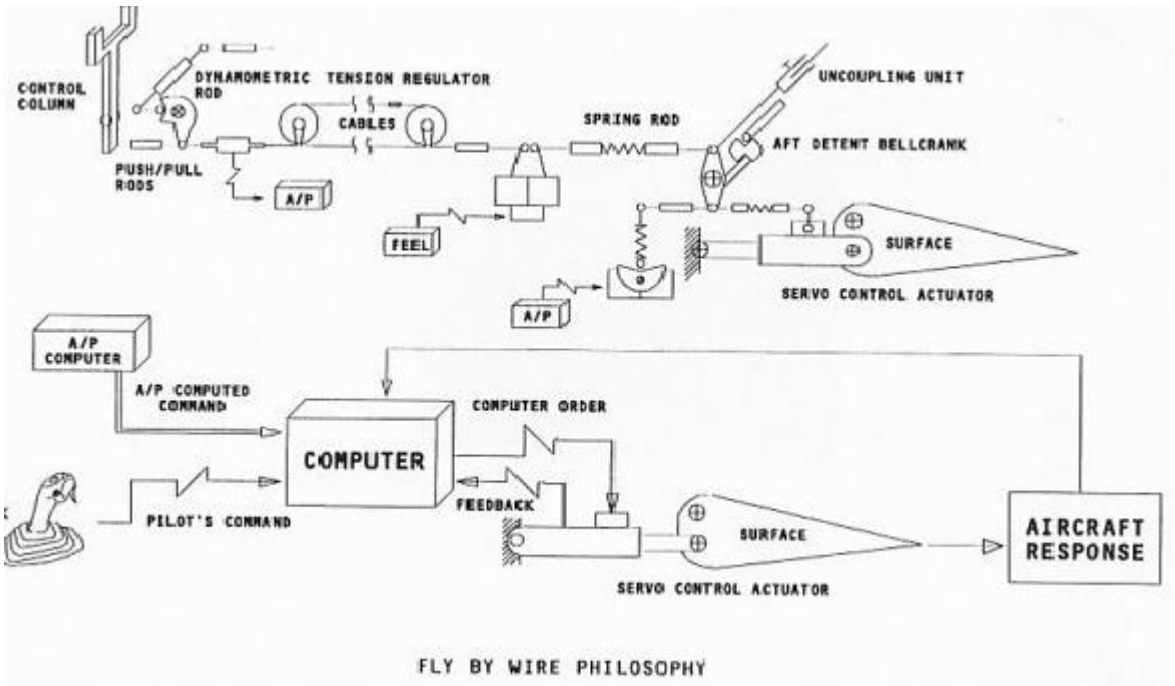
8.Самолет с электронной дистанционной системой управления полетом все равно оборудован штурвалом.

9.Функция отмены автоматики доступна на самолетах Боинг 777. Она позволяет обходить встроенные ограничения

10.На самолетах Airbus 320 воздушные тормоза убираются автоматически, а на Боинге 757 вручную.

Exercise 5

Describe the picture



1. What type of picture is it? (a diagram, a photograph, a chart, a poster, an aerial photoshoot)
2. Which system is shown? Why do you think so?
3. What object(s) can you see at the top (bottom)?
4. What is compared in the diagram?
5. Which flight control type is not shown?

Exercise 6

Comment on the following topics. You should speak continuously

1.Flight controls and HLDs: evolution (mechanical/hydraulic/ fly-by-wire)
2 ATC automation: ACARS DATALINK (pros and cons) TCAS
3 New technologies in cockpit instrumentation: glass cockpit, HUDs vs conventional instruments.

Unit 4 Animals on the filght path

Exercise 1.

Match the terms with their definitions

a)

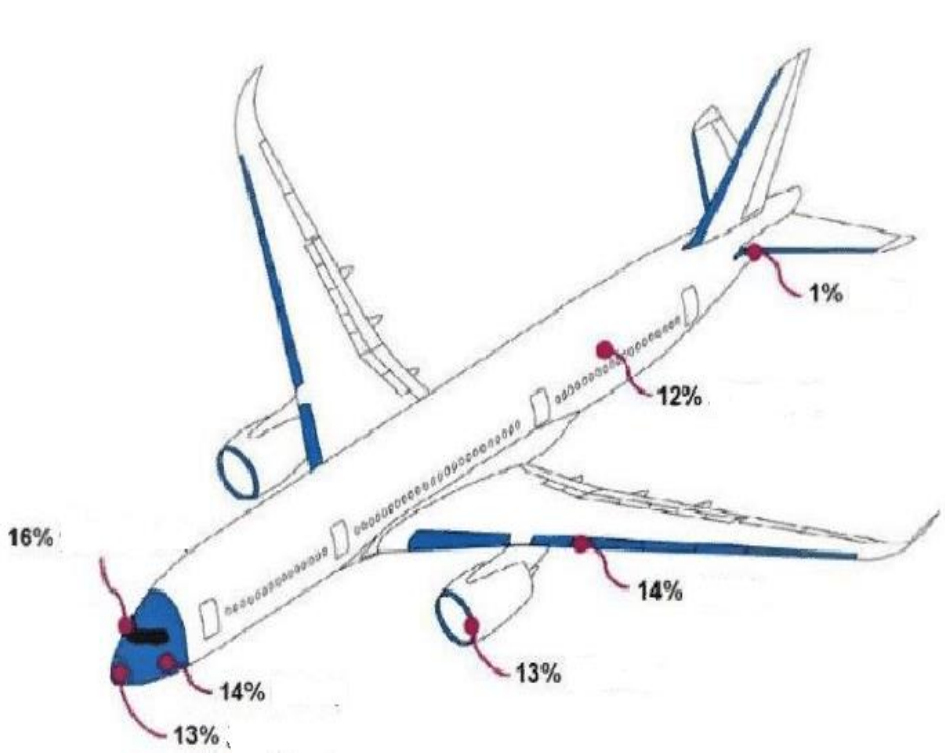
Engine ingestion	the propulsive force of a jet or rocket engine
Multiple strike	producing a great deal of profit.
Runway inspection	Collision with a flock of birds
windshield	the decision speed (sometimes referred to as critical engine speed or critical engine failure speed) by which any decision to reject a takeoff must be made.
thrust	The process of FOD(foreign object debris) monitoring on the RWY
drag	a window at the front of the passenger compartment of a motor vehicle; a windscreen
Engine reliability	the act of sending goods from one place to another
V1	the probability that the engine will perform a specific function under specified operational and environmental conditions at end throughout a specified time
shipping	he resistance force caused by the motion of a body through a fluid, such as water or air.
lucrative	Collision between a bird and an aircraft in motion, especially a jet airplane, in which the bird enters a running engine.
profit	financial gain, especially the difference between the amount earned and the amount spent in buying, operating, or producing something.

b)

smuggler	Buffer strip in the vicinity of tarmac
concourse	a dog trained to find drugs or explosives by smell.
To chase away	one of a row of small cupboards above the seats in a plane where passengers can store things during a flight.
bulkhead	a box or enclosure having some openwork for confining or carrying animals (such as birds)
Closed circuit television	To force to go away
Bird of prey	A system in which signals are not publicly distributed but are monitored
Grass margin	a dividing wall or barrier between separate compartments inside a ship, aircraft, or other vehicle.
hinge	a bird that feeds on animal flesh, distinguished by a hooked bill and sharp talons; a raptor.
cage	a movable joint or mechanism on which a door, gate, or lid swings as it opens and closes or which connects linked objects
Sniffer dog	someone who takes goods or people into or out of a country illegally
Overhead locker(bin)	large open area inside or in front of a public building, station or terminal

Exercise 2

Match the names of aircraft parts vulnerable to bird strikes to the diagram.
There are 3 extra terms.



Tail, wing trailing edge, radome, engine intake, nose, wing leading edge, belly fairing, fuselage, undercarriage.

Exercise 3

Supplementary Reading. Read the reference materials. Translate the words in the italics

a) Non Avian Wildlife Hazards to Aircraft

Non-Avian wildlife hazards to aircraft usually involve *ground dwelling mammals*, which limits the potential consequences of impact, but *bats* - the only flying mammals - are a notable and occasionally significant exception.

Relative Size and the Degree of Hazard

Non-avian wildlife hazards are almost exclusively mammals. The relative sizes of the objects in any aircraft/mammal conflict is understandably significant. An *encounter* between a particular animal and a large transport aircraft might produce relatively insignificant damage whereas if that aircraft is much smaller, the consequences of an impact may even lead directly to an accident. A few animals such as bears and large deer species are so large that the safety of an aircraft of any size would be at risk if one was hit. Fortunately, many larger animal species rarely feature in aircraft impact events although some species like *deer, elk and moose*, which see safety in staying close to other animals, can raise the likelihood of an aircraft encounter having an impact outcome by just this tendency.

It has been suggested that an appropriate general guideline for a minimum size for reporting of non-flying animals actually or potentially hazarding aircraft taking off or landing should be 1 kg. See "Animal Ambush at the Airport: The Need to Broaden ICAO Standards for Bird Strikes to Include *Terrestrial Wildlife*".

Geographic variation in hazard

Much more so than with birds, the likelihood of an aircraft / mammal impact or near miss is extremely location-specific. Mammals have *habitat and foraging requirements* which are specific to *species*, and the runway areas of airports are generally open and treeless habitats which are unattractive to many larger animals because of their *resultant vulnerability* to visual detection by predators and humans. Although it is also the case that many mammal species are mainly active during the hours of darkness, aircraft manoeuvring areas are well lit by the lights ahead of moving aircraft and vehicles. Of course, the natural habits of all animals can be, and are, modified by the perceived attractions of closer-than-normal association with human activity, especially the inevitable availability of edible waste in the vicinity of airport buildings. Such food supply may directly draw in animals which can constitute a direct hazard to aircraft or may indirectly attract larger predators which are themselves hazardous. In some parts of the world, some animal species undertake communal seasonal migrations similar to those made by birds and local awareness will be the only guide to any

resultant increased hazard.

Hazard Control

The only option for large animals at airports used for scheduled service public transport flights is exclusion. Fortunately, this has been aided by the trend towards securing airport perimeters with fencing of a sufficient scale and robustness to deny unauthorised human access. However, such perimeter fencing is not yet universal and is certainly not present at many smaller airports used by business and general aviation and for aerial work and leisure flying.

Mammals Which Regularly Feature in Aircraft Incidents

The chances of recorded incidents involving particular species, obviously depend upon not only propensity to record but on both the extent to which a species is present and the density of aircraft movements. For these reasons, animal species recorded regularly in such incidents are biased towards those found in North America and Europe. Deer species are top of the list overall with over 40 deer strikes per year regularly occurring in North America, many to light aircraft on private flights at airstrips where the operator does not attempt to exclude animals and is not required to. White-tailed and mule deer are most commonly involved. Coyotes are the next animal most often encountered in North America whereas in Europe, red foxes are often the most common sighting at airports of all sizes although they are only quite infrequently hit by aircraft.

Aircraft Certification

Unlike the case of birds and aircraft jet engines or windscreens, there are neither requirements nor manufacturers minimum standards for the parts of aircraft which may impact animals. Landing gear is a particular case. Nose gear impact with, say a fox, at speed may cause significant damage to a smaller aircraft, even up to the size of a 50 seat regional jet. No direct consideration of the effects of impacts of this sort on landing gear assemblies is given by their designers and this includes their important secondary functions as the platform for lower speed directional control (nose gear) and for braking (main gear).

Bats - a Special Case

As the only flying mammals, the hazard to aircraft from bats is similar in nature to that from birds in respect of the potential for airborne impact. However, bats generally fly only between dusk and dawn - although not necessarily only when it is fully dark. Bats can be conveniently divided into two classes, ‘small’ and ‘large’, for hazard assessment, subject to the caveat applied to birds about the hazards of flocking. Generally smaller ‘insectivorous’ bats (so called because they feed exclusively on insects) are found throughout the world whereas generally larger ‘fruit bats’ or ‘flying foxes’ (which are vegetarians) are found everywhere except the Americas. As with birds, bats’ flight habits do depend upon prevailing weather conditions but the insectivorous bats in particular are highly focussed on feeding opportunities and will readily fly even in light rain if

insects are on the wing in numbers. Conditions like this often occur during thunderstorms over land in warm weather when a bird hazard would be unlikely. Insectivorous bat activity usually peaks in the two hours from near darkness and again around dawn. Dawn flight activity is more likely to extend into full daylight. Fruit bats are more likely to begin flight whilst it is only beginning to get dark and continue doing so during the night.

b) SERVICE ANIMALS IN AVIATION

A *service animal* is any animal that is individually trained or able to provide assistance to *a person with a disability*; or any animal that assists persons with disabilities by providing emotional support. Documentation may be required of passengers needing to travel with an emotional support or psychiatric service animal.

Which service animals are allowed in the cabin?

A wide variety of service animals are permitted in the cabin portion of the aircraft flying to and within the United States; however, most service animals tend to be dogs and cats. Airlines may exclude animals that:

Are too large or heavy to be accommodated in the cabin;

Pose a direct threat to the health or safety of others;

Cause a significant disruption of cabin service; or

Are prohibited from entering a foreign country.

Note: Airlines are never required to accept snakes, reptiles, *ferrets, rodents, sugar gliders, and spiders.*

How do airlines determine whether an animal is a service animal?

Airlines can determine whether an animal is a service animal or pet by:

The *credible verbal assurances* of an individual with a disability using the animal;

Looking for physical indicators such as the presence of *a harness or tags*;

Requiring documentation for psychiatric support animals and emotional support animals; and

Observing the behavior of animals.

Emotional Support and Psychiatric Service Animals - Airlines can request specific documentation and/or 48-hours advanced notice for service animals that are emotional support animals and psychiatric service animals.

What kind of documentation can be required of persons travelling with emotional support animals and psychiatric service animals?

Airlines may require documentation that is not older than one year from the date of your scheduled initial flight that states:

You have a mental or emotional disability that is recognized in the Diagnostic and Statistical Manual of Mental Disorders (DSM);

You need your emotional support or psychiatric support animal as an accommodation for air travel and/or for activity at your destination.The individual providing the assessment is a licensed mental health professional and the passenger is under his/her professional care; and the licensed health care

professional's; date and type of professional license; and jurisdiction or state in which their license was issued.

c) SNIFFER DOGS

Today, dogs continue to serve vital roles in maintaining airport security from that first screening before boarding to that final check while crossing through customs and border patrol. It is thanks to months of training, during which the dogs' natural desire to hunt and their incredible olfactory sense are honed, that the pups learn to search for illegal and dangerous items as they search for their favorite toys.

1. They stop the trafficking of live, wild animals.
2. They keep *ivory*, *rhino horn*, and other animal parts from traveling abroad.
3. They find *stacks of cash*.
4. They help *eradicate malaria*.
5. They help prevent the *invasion of plant and animal species*.
6. They keep explosives off planes.
7. They find drugs.
8 They find contraband electronics.
9. They provide comfort to stressed out passengers.

Exercise 4

Translate the following sentences

1.Пилот предпочел прервать взлет после того, как заметил несколько оленей на ВПП.

2.В заднем грузовом отсеке вылетающего самолета питбультерьер выломал петлю клетки и погрыз обшивку отсека.

3.После множественного столкновения со стаей птиц пилот предпочел выключить правый двигатель.

4.Пилот намеревался выровнять самолет и сбросить топливо, очевидно из-за отказа одного из двигателей.

5.Поисковые собаки используются ы аэропортах, чтобы находить запрещенные к перевозке предметы в багаже пассажиров.

6.Хищные птицы используются, чтобы истреблять и отпугивать птиц и мелких животных в районе ВПП.

7.Пилот британского самолета с позывным 332 доложил о стае птиц на прямой и попросил орнитологическую службу прогнать птиц как можно скорее.

8.Я бы предпочел набрать высоту и выполнить левый вираж над полем, по-прежнему с трудом могу выровнять крылья.

9.Камеры видеонаблюдения расставлены по всему аэропорту, что позволяет отслеживать, что происходит.

10.Лобовое стекло кабины было повреждено, видимость нарушена, пилот решил объявить о ЧС на борту.

Exercise 5
Describe the picture

1. What type of picture is it? (a diagram, a photograph, a chart, a poster, an aerial photoshoot)
2. Where was the picture taken from?
3. What is the position of the aircraft in the picture, the adopted configuration?
4. Comment on the aircraft itself (single isle/widebody, long haul/ medium rang/short haul, passenger/cargo, single/twin engine, high/low wing, livery/tail logo)
5. What kind of procedure does this picture represent (routine/emergency) Provide arguments to support your decision.
6. What actions will the pilot take?

Speak about the possible reason for an emergency.

Exercise 6
Comment on the following topics. You should speak continuously

1.Animal hazards in aviation: birdstrikes (consequences /preventive measures)
2.Animal hazards in aviation: animals within the perimeter/on board/as passengers - preventive measures
3. Animals that assist.

Unit 5 Gravity

Exercise 1

Match the terms with their definitions

a)

lift	the aerodynamic force that opposes an aircraft's motion through the air.
thrust	a hinged surface in the trailing edge of an aeroplane wing, used to control the roll of an aircraft about its longitudinal axis.
drag	a vertical aerofoil pivoted from the tailplane of an aircraft, for controlling movement about the vertical axis.
weight	A tendency for an aircraft to yaw to the left due to the descending propeller blade on the right producing more thrust than the ascending blade on the left.
aileron	the undercarriage of an aircraft.
wingtip	A minimal aircraft, requiring minimum power and with slow cruise and landing speeds.
elevators	the outermost edge of a wing
rudder	flight control surfaces, usually at the rear of an aircraft, which control the aircraft's pitch, and therefore the angle of attack and the lift of the wing
assymethrical thrust	a light aircraft that is designed to fly without using an engine
landing gear	An aircraft that can exceed the flight envelope for entertainment, sports, air combat
ultralight aircraft	An action involving an abrupt change in an aircraft attitude, an abnormal attitude, or abnormal acceleration, not necessary for normal flight.
glider	body's relative mass or the quantity of matter contained by it
aerobatic capable aircraft	the propulsive force of a jet or rocket engine.
Aerobatic maneuvre	is the sum of all the forces on a body that force it to move perpendicular to the direction of flow.

b)

Hang-glider	maneuver that starts from level flight with a 1/4 loop up into a straight vertical climb (at full power) until the aircraft loses momentum.
gyrocopter	figure eight aerobatic maneuver for both full-scale and radio-controlled fixed-wing aircraft.
throttle	
RPM –	a special category of stall resulting in autorotation about

revolutions per minute	the vertical axis and a shallow, rotating, downward path.
Half roll	the weight of the vehicle when it's not carrying any passengers, goods or other items.
Full roll	a flying machine, such as an airplane, which is capable of flight using wings that generate lift caused by the aircraft's forward airspeed and the shape of the wings.
Inside loop	is a heavier-than-air flying machine that uses lift generated by wings, called rotary wings or rotor blades, that revolve around a mast.
Outside loop	an aerobatic manoeuvre in which an aircraft follows a single turn of a spiral while rolling once about its longitudinal axis.
hammerhead	the velocity below which an aircraft will descend, or 'stall', regardless of its angle of attack.
Tail slide	a nonsteady flight maneuver in which an aircraft flies a circular path in a vertical plane with the lateral axis of the aircraft remaining horizontal.
Cuban eight	a device controlling the flow of fuel or power to an engine.
Barrel roll	a maneuver in which an airplane starting from straight and level flight passes successively through a dive, inverted flight, and a climb and then returns to normal flight
spin	360º roll
Unladen weight	a flight maneuver in which an airplane rolls halfway over and then flies upside down along its original line of flight.
Stall speed	the number of turns in one minute. It is a unit of rotational speed or the frequency of rotation around a fixed axis.
Fixed-wing aircraft	an aircraft with an unpowered, horizontally rotating propeller on a shaft above the fuselage that provides lift for the machine, with forward propulsion being provided by a conventional propeller: superseded in most applications by the helicopter.
Rotary -wing aircraft	an unpowered flying apparatus for a single person, consisting of a frame with a fabric airfoil stretched over it. The operator is suspended from a harness below and controls flight by body movement.
Hydraulic leak	a maneuver in which an airplane pulls up in a vertical climb until it almost stalls and then drops the nose in a wingover so that direction of flight is reversed.

Exercise 2
Supplementary reading.
Read the reference materials. Translate the words in the italics
a)Pilot Licenses and Certification
Pilots are certified to fly aircraft at one or more named privilege levels and, at each privilege level, are rated to fly aircraft of specific categories. In the US, privilege levels of pilot certificates are (in order of increasing privilege):
Student: Cannot *fly solo* without proper *endorsemen*t from a *certificated flight instructor (CFI)*. Passenger carrying is prohibited.
Sport: Cannot carry more than one passenger, authorized to fly only light-sport aircraft and are limited to daytime flying only. If an individual elects to receive additional instruction, some of the limitations may be removed.
Recreational: May fly aircraft of up to 180 horsepower (130 kW) and 4 seats in the daytime for pleasure only.
Private: May fly for pleasure or personal business. Private pilots cannot be paid, compensated to fly, or hired by any operator.
Commercial: Can be paid, compensated to fly, or hired by operators and are required to have higher training standards than private or sport pilots.
Flight instructor: Flight instructors are commercial pilots who have been trained and can demonstrate various teaching techniques, skills and knowledge related to safely teaching people to fly.
Airline transport pilot: ATPs, as they are called, typically qualify to fly the major airliners of the US transit system. ATPs must qualify with a range of experience and training to be considered for this certificate.
Pilot privileges are further broken down into category, class, and type ratings.
A category is defined as "a broad classification of aircraft," which a pilot may be rated for:
Airplane
Rotorcraft
Glider
Lighter-than-air
Powered-lift
Powered parachute
Weight-shift-control
A class is defined as "a classification of aircraft within a category having similar operating characteristics":
Single-engine
Multiengine
Land
Water
Gyroplane
Helicopter
Airship

Free balloon
In addition, a type rating is required for particular aircraft over 12,500 pounds, or aircraft that are turbojet-powered. Further endorsements are required for *high-performance* (more than 200 horsepower), *complex* (retractable landing gear, flaps, and a controllable-pitch propeller), *or tailwheel-equipped aircraft*, as well as for high-altitude operations.
Most private pilot certificates are issued as "private pilot: airplane single-engine land," which means the pilot may fly any single-engine, land-based airplane they are qualified in. A pilot is only qualified in the category and class of aircraft in which they successfully complete their *checkride* (for example, a pilot who takes a commercial pilot checkride in a multi-engine, land-based aircraft and passes, may only exercise the privileges of a commercial pilot in multi-engine, land-based aircraft; the pilot may not exercise the privileges of a commercial pilot in single-engine or sea-based aircraft without passing the appropriate parts of a checkride in those particular categories of aircraft).
Pilots of powered aircraft typically attain ratings in this order (with minimum time required in parentheses):

Private pilot (35–45 hours of flight time, 40 in the U.S.)
Instrument rating (40–50 hours of instrument time, 40 in the U.S.)
Commercial pilot (200–250 hours of flight time, 250 in the U.S.)
Commercial pilot who is a co-pilot in an airliner (250 hours of flight time + multicrew rating, not allowed in the U.S.)
Airline transport pilot (ATP) (1200–1500 hours of flight time, 1500 in the U.S.)
Note: Hours can often be earned *concurrently and are cumulative*. For example, after acquiring a private certificate, a pilot can get an instrument rating with an additional 30–40 hours of training (if, e.g., 10 hours of instrument time was logged during private training, which would count towards total aeronautical experience gained). In the course of the commercial pilot training, most pilots also receive their high-performance and complex endorsements, as well as get a multiengine rating before applying for the airline transport pilot licence.

Further information: Class rating and Type rating
Private pilot
The majority of pilots hold a private pilot license. To obtain a private pilot license, one must be at least 17 years old and have a minimum of 35–45 hours of flight time, including at least 20 hours of dual instruction and 10 hours of solo flight. Pilots trained according to accelerated curricula outlined in Part 141 of the Federal Aviation Regulations may be certified with a minimum of 35 hours of flight time. Private pilots may not fly for compensation or hire. However, they may carry passengers as long as the pilot has the appropriate training, ratings, and endorsements. Private pilots must have a current Class III medical exam, which must be renewed every 24 or 60 months (depending on

age). In addition, private pilots must re-validate their pilot certificates every 24 months by undertaking a flight review with a certificated flight instructor (CFI).

Instrument rating

An instrument rating is technically not a pilot certificate, but an add-on rating that allows a pilot to fly in weather with reduced visibility such as rain, low clouds, or heavy haze. When flying in these conditions, pilots follow instrument flight rules (IFR). The training provides the skills needed to complete flights with less than the required VFR minimums. In the US, all pilots who fly above 18,000 feet above mean sea level (MSL) (a lower limit of Class A airspace) must have an instrument rating, and must be on an IFR flight plan.

This rating requires highly specialized training by a certificated flight instructor (CFI) with a special instrument instruction rating (CFII), and completion of an additional written exam, oral exam, and flight test. Pilots applying for an instrument rating must hold a current private pilot certificate and medical, have logged at least 50 hours of cross-country flight time as pilot-in-command, and have at least 40 hours of actual or simulated instrument time including at least 15 hours of instrument flight training and instrument training on cross-country flight procedures.

Commercial pilot

Commercial pilots can be paid to fly an aircraft. To obtain a commercial pilot license, one must be at least 18 years old and have a minimum of 250 hours of total flight time (190 hours under the accelerated curriculum defined in Part 141 of the Federal Aviation Regulations). This includes 100 hours in powered aircraft, 50 hours in airplanes, and 100 hours as pilot-in-command (of which 50 hours must be cross-country flight time). In addition, commercial pilots must hold an instrument rating, or otherwise they would be restricted to flying for hire only in daylight, under visual flight rules (VFR), and within 50 miles of the originating airport.

Airline transport pilot

Airline transport pilots (ATP) must be at least 23 years old and have a minimum of 1,500 hours of flight time, including 500 hours of cross-country flight time, 100 hours of night flying, and 75 hours in actual or simulated instrument flight conditions. ATPs must also have a commercial certificate and an instrument rating. ATPs may instruct other pilots in air transportation service in aircraft in which they are rated. ATPs must have a current Class I medical exam (which is more stringent than Class II or Class III), which must be renewed every six months or one year (depending on age). Like all pilots, they must re-validate their certificates every 24 months with a flight review.[2][10]

Multi-crew pilot license

MPL pilots must be at least 18 years old, have a minimum of 250 hours of flying training, and 750 hours of theoretical knowledge instruction. Developed by the International Civil Aviation Organization (ICAO), requirements for the

multi-crew pilot license (aeroplane) (MPL(A)) were included in the 10th edition of Annex 1 to the Convention on International Civil Aviation (Personnel Licensing), which superseded all previous editions of the Annex on 23 November 2006.[11] MPL is a significant development as it is based on competency-based approach to training professional pilots. It represents the first time in 30 years that ICAO had significantly reviewed the standards for the training of flight crew.
b) Hydraulic leak consequences
Depending on the specific failure or the extent of damage to the hydraulic system(s), the following effects could result:

Loss of control
Partial or complete loss of control over specific control surfaces
Loss of autopilot
Reversion to a degraded flight control law
Impact on/*collateral* damage to other systems (e.g. due to a ruptured hydraulic pipe)
Possible loss of ETOPS (Extended Twin Engine OPerationS) and/or RVSM (Reduced vertical separation minima)capability
Loss of low visibility landing capability due to degraded autopilot or flight controls
Difficulties with normal landing gear extension
Inability to retract landing gear
Inability to extend/retract *high lift devices* such as flaps or slats
Reduced braking capability upon landing
Loss of *anti-skid systems*
Inability to actuate *thrust reversers*
Loss of *nosewheel steering*

Exercise 3
What do these abbreviations stand for? Be ready to define them.

RPM, PPL, ATPL, MPL, UAV, ETOPS, CFI, FAA, RVSM ICAO, EASA.

Exercise 4
Translate the following sentences:
1.Роторфлай – соостный сверхлегкий вертолет с четырьмя лопастями на несущем винте.
2.Управление дросселем осуществляется переключателем на штурвальной колонке.
3.Экипаж не мог выровнять самолет из-за отказа двигателя.
4.Спортивные самолеты более маневренные и имеют бОльшую энерговооруженность.

5.Набор с креном на крутой горке (ранверсман) не удался, элерон не сработал из-за утечки гидравлики.
6.Механические органы управления самолетом перемещают аэродинамические поверхности посредством штоков, тросов и блоков роликов.
7.Скорость набора маневренного самолета выше, чем у этого легкого.
8.Управление по тангажу осуществляется поворотом рулей высоты
9.Экипаж с трудом контролировал угловое положение самолета из-за утечки гидравлики.
10. Из-за сильного сдвига ветра вертолет с трудом удерживал положение над полем.

Exercise 5
Describe the picture

1. What type of picture is it? (a diagram, a photograph, a chart, a poster, an aerial photoshoot)
2. Where was the picture taken from?
3. What is the position of the aircraft in the picture?
4. Why, in your opinion, the aircraft are at their full exhibit?
5. What kind of event would require the aircraft to be shown like that? Provide arguments to support your decision.

Exercise 6
Comment on the following topics. You should speak continuously.
1. Four forces acting on a plane in flight, Bernoulli principle, three basic aerodynamic movements, the way they are controlled.
2 Hydraulic failure, the affected end users, solutions, ATC actions
3 Ultralight a/c; kinds, dangers, UAVs
4.Aerobatics: definition, aerobatic maneuvers.

Unit 6 Health

Exercise 1

Match the terms with their definitions. Collocate them with the verbs. You may consult the dictionary:

a)

Deep Vein Thromboses	the main issue you are experiencing that is causing your symptoms.
Med link	a chronological age of 65 years old or older
Air rage	wide variations of temperature and vibrations
Underlying medical condition	Learning to provide immediate assistance to any person suffering from either a minor or serious illness or injury, with care provided to preserve life, prevent the condition from worsening, or to promote recovery.
Elderly age	The organization that assists airlines with managing in-flight medical events – and their prevention.
Extremes in temperature and vibration	Air rage is disruptive or violent behavior on the part of passengers and crew of aircraft, especially during flight.
Medical kit	the formation of a blood clot in a deep vein, most commonly the legs. Symptoms may include pain, swelling, redness, or warmth of the affected area.
First aid training	a collection of supplies and equipment that is used to give medical treatment.
CRM crew resourse management	subjective feeling of tiredness that has a gradual onset. Unlike weakness, it can be alleviated by periods of rest.
fatigue	a feeling of calm satisfaction with your own abilities or situation that prevents you from trying harder
complacency	a state of being disabled, or unable to move or function.
incapacitation	a set of training procedures for use in environments where human error can have devastating effects.

b)

Allergic reaction	an arm or leg of a person or four-legged animal, or a bird's wing.
cut	a sudden occurrence of coronary thrombosis, typically resulting in the death of part of a heart muscle and sometimes fatal.
fracture	an extreme, often life-threatening allergic reaction to an antigen to which the body has become hypersensitive.
twist	a device that shows the electrical and pressure waveforms of the cardiovascular system for measurement and treatment.

limb	a shot, or a dose of medicine given by way of a syringe and a needle.
Asthma attack	a pharmaceutical agent that causes widening of blood vessels
injury	an emergency procedure that combines chest compressions often with artificial ventilation in an effort to manually preserve intact brain function until further measures are taken to restore spontaneous blood circulation and breathing in a person who is in cardiac arrest.
Diabetic episode	a passageway for air into or out of the lungs specifically
Heart attack	A strain, pull and/or tear of a muscle and/or tendon.
Anaphylactic shock	a portable device for administering a drug which is to be breathed in, used for relieving asthma and other bronchial or nasal congestion.
Cardiac monitor	when the blood glucose level (also called blood sugar) is too low, usually below 4mmol/l.
injection	hurt, damage, or loss sustained.
inhaler	an injury made when the skin is penetrated with something sharp
Vasodilator spray	If something hard, such as a bone, breaks or cracks
CPR cardiopulmonary resuscitation	a sudden worsening of the symptoms caused by the tightening of muscles around your airways (bronchospasm). The lining of the airways also becomes swollen or inflamed and thicker mucus
airways	sensitivities to substances called allergens that come into contact with the skin, nose, eyes, respiratory tract, and gastrointestinal tract.

Exercise 2

Supplementary reading. Read the reference materials. Translate the words in the italics

a)

In-flight medical emergencies can be broadly divided into two categories - injury related or health related situations. Injuries can occur as a result of a turbulence *encounte*r, luggage falling from an overhead bin, an onboard *altercation* or due to *burns or scalds* resulting from contact with hot liquids or galley ovens. Health issues for a single passenger can range from *fainting* or *shortness of breath* to allergic reaction to missed medication to *gastrointestinal issues* to *stroke*, heart attack or even death. In very rare cases, food poisoning or a *commutable disease* may affect an number of passengers at the same time When an in-flight medical emergency occurs, immediate access to care is

limited. Cabin crew are trained to provide first aid and limited medical assistance but are not qualified to deal with all potential situations. It is, therefore, critical that airlines have protocols in place for actions to be taken in the event of an on-board medical emergency. *Adherence to these protocols* will help to ensure the best possible outcome for the situation at hand.

b)

On-Board Medical Equipment

Regulations on what emergency equipment must be carried and what optional equipment can carried vary by National Aviation Authority. In all cases, one or more *first aid kits (FAK)* will be on the aircraft. These contain most of the items that might be required to deal with a *non life threatening injury* such as a burn, cut or broken bone. Cabin crew are fully trained in emergency first aid procedures.

Therapeutic oxygen is also universally carried, normally in portable oxygen cylinders fitted with a regulator and mask. Cabin crew are trained to administer oxygen to passengers experiencing breathing difficulties or are manifesting other symptoms for which supplemental oxygen is appropriate.

An Automated External Defibrillator (AED) is carried on board most commercial aircraft for heart related emergencies. Cabin crew are trained and qualified in the use of this equipment and are also trained and qualified in CPR (cardiopulmonary resuscitation).

A physician's kit or emergency medical kit, containing various drugs and both diagnostic and invasive medical instruments, is carried on board many commercial aircraft. Cabin crew are not trained or qualified to administer drugs and the contents of this kit can only be accessed and administered by a licensed medical practitioner, should one be on board. Typically, a physician's kit will contain some or all of the following (Source: Aerospace Medical Association):

Medications (not all are listed)

Epinephrine 1:1,000,Antihistamine, injectable (inj.),Dextrose 50%, inj. 50 mL (or equivalent),Nitroglycerin tablets or spray,Major analgesic, inj. or oral Atropine, inj., Corticosteroid, inj, Diuretic, inj,,Medication for *postpartum bleeding, S*yringes, Needles, Antiseptic wipes, Gloves, *Venous tourniquet*

c)

CRM

Investigations have shown that human error is a contributing factor in 60 to 80 percent of air carrier incidents and accidents. These events have common characteristics. Many problems encountered by flight crews have very little to do with the technical aspects of operating in a multi-person cockpit. Instead, problems are associated with poor group decision making, ineffective communication, inadequate leadership and poor task or resource management. Pilot training programs used to focus almost exclusively on the technical aspects of flying and on an individual pilot’s performance; they did not effectively address crew management issues that are also fundamental to safe

flight.
Crew resource management (CRM) has become an integral part of training and operations. This briefing note presents the basics for implementing CRM within an airline based on a tried-and-tested structure from which all aspects of CRM training can be developed to the required detail. Guidance is presented in practical terms so that operators can immediately begin to move forward with their CRM training programs; it may thereafter be used to trigger more academic and in-depth studies on specific items, as required.

Exercise 3
Translate the sentences.
1.Резкий набор высоты был прерван из-за приступа кессонной болезни у аквалангиста на борту.
2.Современные аптечки на борту самолета укомплектованы дефибрилятором, чтобы запустить сердце, если реанимационные мероприятия не дали результат.
3.Бортпроводники проходят специальное обучение, как оказывать первую помощь.
4.В случае остановки сердца необходимо подключить пациента к кардиомонитору, чтобы передавать данные о его состоянии консультанту на земле.
5.Шприц с дозой адреналина был применен экипажем для снятия отека Квинке.
6.Неожиданная турбулентность может привести к переломам конечностей или другим повреждениям.
7.Чрезмерное потребление алкоголя может привести к хулиганству на борту, эпилептическому припадку или даже к сердечному приступу.
8.Хорошим способом зафиксировать сломанную конечность является наложение шины с последующим наложением гипса.
9.В случае экстренной медицинской ситуации на борту, экипаж может связаться с консультантом Медлинк, найти врача среди пассажиров или развернуть полет на запасной аэродром.
10.Тромбоз глубоких вен является ведущей причиной смерти в полете.

Exercise 4
What do these abbreviations stand for?

CPR, DVT, CRM, AED, FAK.

Exercise 5
Describe the picture

1. What type of picture is it? (a diagram, a photograph, a chart, a poster, an aerial photoshoot)
2. Where does the action of this picture take place?
3. What object(s) can you see in the foreground (background)?
4. What kind of procedure does this picture represent (routine/emergency) Provide arguments to support your decision.

Exercise 6
Comment on the following topics. You should speak continuously

1 Contributing causes to medical emergencies on board
2.Health impairments caused by flying; first aid for different episodes and attacks, medical kit contents.
3 Human Factor in aviation: basic reasons, solutions, CRM areas

Unit 7Fire.

Exercise 1.
Match the terms with their definitions.
a)

Dangerous goods	smokelike or vaporous exhalation from matter or substances, of an odorous or harmful nature
screening	The measure which is only possible with variable pitch propellers and means that the blades are turned such that their mid-to-outer section is aligned with airflow and they create minimal air resistance. This is done when the engine is shut down and the propeller should create minimal drag.
Security measures	A situation when aircraft on takeoff or landing roll extends beyond the end of the runway
Toxic fumes	a designated way out of a building or vehicle, to be used for escape in the event of an emergency
Oxygen generator	A special kind of emergency exit, used where conventional fire escape stairways are impractical. The chute is a fabric (or occasionally metal) tube installed near a special exit on an upper floor or roof of a building, or a tall structure.
Feathering the propeller	To jump or dive quickly and energetically
Runway overrun	a deep narrow valley with steep sides
Emergency exit	a device that releases oxygen via a chemical reaction. The oxygen source is usually an inorganic superoxide, chlorate, or perchlorate; ozonides are a promising group of oxygen sources.
Escape chute	taken as a precaution against theft or espionage or sabotage etc
To plunge	An electronic, visual, or manual inspection or search of persons, vehicles, packages, and containers for the purpose of detecting the possession or attempted introduction of illegal, prohibited, or other dangerous items into a Federal facility or secure area within a Federal facility.
ravine	items or substances that when transported are a risk to health, safety, property or the environment.

b)

Flammable liquid	Real estate for rent
Ignition source	a device, generally at an airport, that delivers checked luggage to the passengers at the baggage reclaim area at their final destination.
Stowed baggage	an electrical circuit in a device of lower resistance than that of a normal circuit, especially one resulting from the unintended contact of components and consequent accidental diversion of the current.

Freight-forwarder	the point at which a conductor from an electrical component, device or network comes to an end and provides a point of connection to external circuits.
premise	a type of detergent (cleaning agent) that is added for cleaning
Baggage carousel	Hard chemical prone to rust, may cause severe burns
Wet-cell battery	
Smoke detector	luggage delivered to an airline or train for transportation in the hold of an aircraft or baggage car of a passenger train.
Short circuit	homogeneous mixture of two or more substances.
Electrical terminal	a forest firefighter who parachutes to locations otherwise difficult to reach.
Laundry product	original type of rechargeable battery. It is commonly found in aviation, electric utilities, energy storage and cellphone towers. The battery contains a liquid electrolyte such as sulfuric acid, a dangerous corrosive liquid.
Corrosive solid	company that receives and ships goods on behalf of other companies.
Chemical solution	a process or event which can cause a fire or explosion
Smoke jumper	a large, destructive fire that spreads quickly over woodland or brush.
Wild fire	a fire-protection device that automatically detects and gives a warning of the presence of smoke
Circuit-breaker	a combustible liquid which can be easily ignited in air at ambient temperatures, i.e. it has a flash point at or below nominal threshold temperatures defined by a number of national and international standards organizations.

Exercise 2

Give the English equivalents to the following words and word combinations:

Гореть, жечь, зажигать, поджигать, загораться, сдерживать пожар, локализовать пожар, источник возгорания, пламя, сбить пламя, подниматься по тревоге, взять полный комплект оборудования, распылять жидкость для пожаротушения, вырубать растительность.

Exercise 3

Supplementary reading. Read the reference materials. Translate the words in the italics

a) Accidents & Serious Incidents involving Dangerous Goods which Resulted in a Fire

A333, Manila Philippines, 2013 (On 7 October 2013 a fire was discovered in the *rear hold* of an Airbus A330 shortly after it had arrived at its parking stand after an international passenger flight. The fire was eventually extinguished but only after substantial fire damage had been caused to the hold. The subsequent Investigation found that the actions of the flight crew, ground crew and airport fire service following the discovery of the fire had all been unsatisfactory. It also established that the source of the fire had been inadequately packed dangerous goods in passengers checked baggage on the just-completed flight.

B738, Dubai UAE, 2013 On 6 December 2013, a Boeing 737-800 passenger aircraft was flown from Amman to Dubai out of revenue service with a quantity of 'live' boxed chemical oxygen generators on board as cargo *without the awareness of the aircraft commander.* The subsequent Investigation found that this was possible because of a wholesale failure of the aircraft operator to *effectively oversee* operational risk implicit in sub-contracting heavy maintenance. As a result of the investigation, a previously unreported flight by the same operator in revenue service which had also carried live oxygen generators was disclosed.

b)

Fire in the air is one of the most hazardous situations that a flight crew can be faced with. Without aggressive intervention by the flight crew, a fire on board an aircraft can lead to the catastrophic loss of that aircraft within a very short space of time. Once a fire has become established, it is unlikely that the crew will be able to extinguish it. Time is critical

The following table from a UK CAA report in 2002 supports the generally held view that, from the first indication that there is a fire onboard the aircraft, the crew has on average approximately 17 minutes to get the aircraft on the ground.

Types

Engine Fire. An engine fire is normally detected and contained satisfactorily by the aircraft fire detection and suppression systems. However, in certain circumstances (e.g. an explosive breakup of the turbine), the nature of the fire is such that onboard systems may not be able to contain the fire and it may spread to the wing and/or fuselage. Where an engine fire has been successfully contained, there is still a risk that the fire may reignite and therefore it is still advisable for the crew to land the aircraft as soon as possible and allow fire crews to carry out a visual examination of the engine.

Cabin Fire. A fire within the cabin will usually be detected early and be contained by the crew using onboard fire fighting equipment. As with an engine fire, it is still advisable to land the aircraft as soon as possible and carry out a detailed examination of the cause of the fire and any damage.

Hidden Fire A hidden fire may be detected by onboard fire detection systems or by the crew or passengers noticing smoke or fumes, a hot spot on a wall or floor,

or by unusual electrical malfunctions particularly when the systems are unrelated. This is the most dangerous type of fire for 2 reasons:
Hidden fires are difficult to locate and access in order to fight them. The time delay may allow the fire to take hold and do considerable damage to the aircraft. A hidden fire may initially be difficult to confirm and the crew may be slow to initiate an emergency landing. The consequence of such a delay may be that the fire becomes non-survivable before the aircraft has an opportunity to land.

Effects

Smoke & Fumes. Smoke can reduce visibility within the aircraft. An electrical fire in an aircraft typically generates a lot of thick white smoke which can render the flight crew blind, unable to see the instruments or see out of the windows. In such circumstances, unless the smoke can be cleared, the crew are unable to control the aircraft. Smoke and fumes from an in-flight fire are likely to be highly toxic and irritating to the eyes and respiratory system. Smoke and fumes may therefore quickly incapacitate the crew unless they take protective action.
Heat. Heat from fires will affect aircraft systems and ultimately affect the structural integrity of the aircraft both of which will lead to Loss of Control

c)**Emergency Evacuation** is the urgent abandonment of an aircraft utilising all useable exits.

An inflight fire, smoke or fume emergency will be dealt with as aggressively as possible by the crew and, if appropriate, an immediate diversion to landing will be initiated. If the emergency is not secured, once on the ground, the most appropriate course of action is to remove the passengers and crew from the risk as a precautionary measure. Likewise, in the event of an uncontrolled engine or airframe fire during ground operations, an aircraft crash on a takeoff or landing, or any other situation that results in fire or structural failure, the best defence available is an immediate evacuation of the aircraft.

As part of the certification process, aircraft manufacturers are required to demonstrate that an aircraft, in maximum density configuration, can be completely evacuated within 90 seconds using only half of the total number of emergency exits. Use of only half of the exits simulates the potential for failed evacuation devices or exits blocked due to fire or structural damage. Ninety seconds has been established as the maximum evacuation time because tests have shown that, in a post crash fire, conditions conducive to flashover are unlikely to occur within that time span. However, the experience of actual evacuations, especially unexpected ones from full aircraft where the abnormal situation occurs suddenly at or soon after landing, indicates that evacuation times usually exceed durations demonstrated for certification purposes.

Common safety deficiencies during the evacuation process are often associated with communications, exit operation, passenger preparedness for evacuations, and the presence of fire, smoke, and toxic fumes.

An evacuation slide is *an inflatable device* which *facilitates* the rapid evacuation of an aircraft. Slides are required on all passenger carrying aircraft where the door sill height (measured as the normal height above ground level) is such that able bodied passengers would be unable to jump or "step down" from the exit without a significant risk of injury. This has been interpreted in Regulatory requirements as meaning slides must be installed at all aircraft doors where the floor is 1.8 metres (6 feet) or more above the ground. Slides are also required on *overwing exits* when the height of the wing above the ground, with the flaps fully extended, exceeds the maximum certified distance or where an evacuation route ahead of the wing is intended. Some slides are also designed to *serve as rafts* when detached from the aircraft in the event of a landing on water.
In the case of over-wing exits, no slide is required providing the escape route *utilizes* the flap surface and the height to the ground from the trailing edge of the flap is less than six feet
Evacuation is normally ordered by the Captain. However, if communication with the flight crew is not possible and the situation in the cabin is judged by the senior cabin crew member to be incompatible with any delay, then they are trained to make the evacuation order themselves once the aircraft has come to a complete stop. In these circumstances, they are responsible for assessing immediate danger such as external fire or engines still running before any exit is opened. Cabin crew supervising exits must also secure the exit until the slide (if the exit is so equipped) inflates and block the exit from use in the event of a slide malfunction. They are also expected to motivate passengers using appropriate shouted commands and if necessary, physical action, to exit quickly and to leave behind personal possessions, especially items in overhead lockers or under seats. Normally, the Cabin Crew will be the last to leave their exit; however, in practice they are trained to remain on board only to the point when they believe that by staying any longer they are putting their own lives at risk. Once they are out of the aircraft, they are trained to assist in moving passengers away from the aircraft to a position where they can be safely grouped together.

Exercise 4
Translate the sentences

1.В случае пожара на борту первая задача – сбить пламя.
2.Короткое замыкание возникло из-за разболтавшейся проводки.
3.Запрещенные к провозу предметы могут быть абсолютно безопасными на земле, но под действием перепадов температур и давления, а также вибрации они становятся воспламеняемыми.
4.В случае лесного пожара аварийно-спасательная команда поднимается по тревоге.

5.Огонь распространяется из хвоста самолёта. Принесите огнетушитель.
6.Самолёт противопожарной службы залил лесной пожар при помощи специальной жидкости, и теперь наземные бригады сдерживали пожар.
7.- Вы объявляете о ЧС на борту? - Пока нет, в задней части самолёта бортпроводники почувствовали запах тлеющей проводки.
8.Подготовьте ВПП к посадке на фюзеляж.
9.Перегрев вентилятора возник из-за излишней перегрузки, и густой дым заполнил салон.
10.Вам не разрешается проносить аккумулятор на борт, даже если вы слили из него кислоту.

Exercise 5

Describe the picture

1. What type of picture is it? (a diagram, a photograph, a chart, a poster, an aerial photoshoot)
2. Where does the action of this picture take place? (on the airfield, in the control tower, inside the terminal, in some aerodrome facility)
3. What object(s) can you see in the foreground (background)?
4 Describe the a/c itself
5 Do you think this is this is an actual footage or a fake? Give arguments to support your decision.

Exercise 6

Comment on the following topics. You should speak continuously:

1. Dangerous goods: examples, reasons for prohibition.
2.Engine fire – actions, reasons, duties of the ATC
3.Emergency evacuation procedures: danger, timing, duties of the cabin/flight crews and ATCs.