COMPLANG
Aviation Training Centre

# AVIATION ENGLISH

# FOR

# RADIOTELEPHONY

Student's Book

## UNIT 1

### *Numerals in radiotelephony*

1. *Discussion*
   - *What units of measurement listed below are used for transmission of the following values? You have some sentence patterns as examples; please use them while answering the question.*

*Example:*
*We use* **degrees** *for transmitting temperature,*
*or*
*In radiotelephony,* **degrees** *are used for transmitting temperature.*

altitude feet, meters
height
heading
track
wind direction and velocity wind speed
QFE hectopascals
QNH
flight level feet
transition level
cloud base
visibility kilometers
vertical visibility meters
runway visual range RVR meters

(degrees, hectopascals, feet, meters, kilometers, meters per second, knots, statute miles, nautical miles)

2. *Work in pairs or groups: discuss where such units of measurement as* **knots, statute miles, feet** *and* **inches** *are used. What data are transmitted in knots, statute miles, feet and inches? What units of measurement are used in your country?*

3. *Read the information paper and answer the questions:*

   1) *What's the difference between frequencies and channels?*
   2) *How can the pilot know that he is being handed over to 8.33 frequency?*
   3) *In what countries are 8,33kHz radios used?*
   4) *At what flight levels is the carriage and operation of 8.33 kHz radios mandatory?*

General

Due to a shortage of VHF R/T frequencies, it was decided to split the current spacing from 25 kHz to 8.33 kHz. This leads to an increase of the number of available frequencies which permits the creation of new control sectors, thereby contributing to an increase in ATM capacity in the European region.

Date of operation and mandatory carriage

The carriage and operation of 8.33 kHz radio equipment is mandatory above FL195 in the ICAO EUR Region since 15 March 2007.

Area of operation
Currently, the following States enforce mandatory carriage above FL195:

*Albania, Austria, Belarus, Belgium, Bosnia & Herzegovina, Croatia, Czech Republic, Denmark, Estonia, Finland, France, Former Yugoslav Republic of Macedonia, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Netherlands, Norway, Poland, Romania, Serbia, Montenegro, Slovak Republic, Slovenia, Sweden, Switzerland, United Kingdom, Bulgaria, Cyprus, Malta, Portugal, Spain.*

Aircraft equipment
Aircraft must be equipped with two independent sets of 8.33 kHz radios.

Exemptions
No exemptions can be granted within sectors where 8.33 kHz channel spacing is in use. The States are responsible for the publication of exemptions outside the 8.33 sector.

Phraseology
The phraseology has been approved by ICAO. It is complementary to the existing one. The 8.33 kHz frequencies must be identified in pilot and controller voice communications.
The key word "channel" must be used for this purpose and reminds whoever is receiving the message to wait for 3 digits after the decimal point. Note that 3 digits after the decimal point are mandatory in the 8.33 mode, whilst only 2 digits are required to specify a frequency in the 25 kHz mode.

Communication failure
In this case, the standard procedure in the airspace concerned has to be applied.

*(From Eurocontrol Information Notice)*

*Work in pairs:*

- *(P) Is the aircraft type you fly equipped with 8.33 kHz radios? Share your experience of flying to countries where 8.33 kHz radios are used with your partner.*
- *(C)On what frequencies do you communicate with pilots in your ATC center? How do you transmit VHF frequencies?*

***The radiotelephony spelling alphabet***

The radiotelephony spelling alphabet assigns code words to the letters of the English alphabet (*Alfa* for A, *Bravo* for B, etc.) so that critical combinations of letters (and numbers) can be pronounced and understood by those who transmit and receive voice messages by radio or telephone regardless of their native language, especially when the safety of navigation or persons is essential. The paramount reason is to ensure intelligibility of voice signals over radio links.

4. *Discuss, in what ways radiotelephony alphabet is used in radio communications? How are ICAO airdrome and FIR location indicators transmitted? (Airways? Navigation aids? Significant points? Waypoints?)*

*What is the difference between abbreviations and contractions? Could you give examples? How will you pronounce the following data: MSA NDB; RWY 32R; OSM VOR; TNK; TWY D1, MNP DME?*

5. *What is the difference between abbreviations and contractions? Could you give examples?*

### *Radiotelephony call signs for aircraft*

6. *Look at the table. What can an aircraft call sign consist of?*

| Type of call sign | Full call sign | Abbreviated call sign |
|---|---|---|
| A) aircraft registration<br>or:<br>aircraft manufacturer or aircraft model and registration | F-ABCD<br>N-ML8FZ<br>Gulfstream R-ABCD | F-CD<br>N-8FZ<br>Gulfstream R-CD |
| B) R/T call sign and aircraft registration | Speedbird ABCD | Speedbird CD |
| C) R/T call sign of operating agency and flight number | Speedbird 872 | Speedbird 872 |
| D) three letters code of operating company and flight number | BAW 872 | BAW 872 |

7. *Work in groups. Recall as many flight types as possible.*

8. *Pronounce all data correctly and match them with the definitions:*

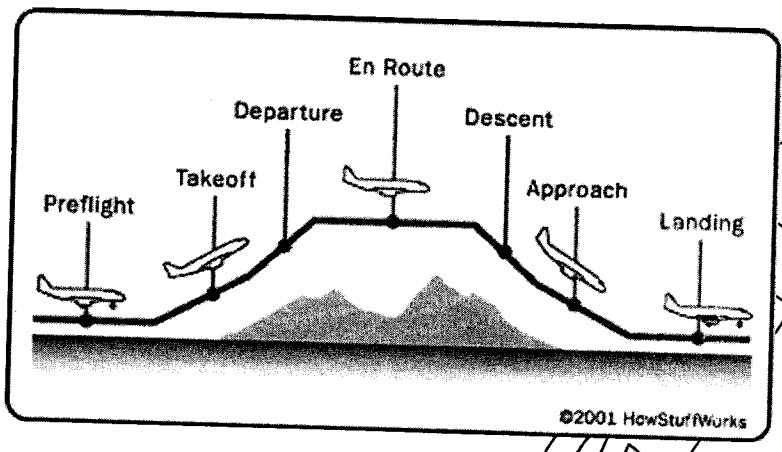
| | |
|---|---|
| a) VBCDL | 1) Location indicator of FIR |
| b) MD-1011 | 2) Navigation aid designation |
| c) LLLL | 3) Airway designation |
| d) UR167 | 4) Waypoint name |
| e) 32C | 5) Aircraft type |
| f) SELIN 2 Bravo | 6) Aircraft call sign |
| g) LIRF | 7) Aircraft registration |
| h) TAMAK | 8) Radiotelephony call sign of operating agency |
| i) Speedbird | 9) SID designation |
| j) AFR 8778 | 10) Runway designator |
| k) MSA DME | 11) Location indicator of the airport |

### *Radiotelephony call signs for aeronautical stations*

9. *Put the different phases of flight in the correct sequence:*

Climb, take-off, descent, start-up, approach, cruise, push back, final approach, taxi, take-off roll, touchdown, line-up.

- *Work with a partner. Which ATC units and ground stations does the pilot contact at different stages of flight?*




*10. Read the text:*

While the passengers prepare for their flight by checking their bags and walking to the gate, the pilot inspects his plane and files a flight plan – all IFR pilots must file a flight plan at least 30 minutes prior to pushing back from the gate. The flight plan includes:

- ✓ Airline name and flight number
- ✓ Type of aircraft and equipment
- ✓ Intended airspeed and cruising altitude
- ✓ Route of flight (departure airport, centers that will be crossed and destination airport).

A controller called a flight data person reviews the weather and flight plan information and enters the flight plan into the computer. The computer generates a flight progress strip that will be passed from controller to controller throughout the flight. The flight progress strip contains all of the necessary data for tracking the plane during its flight and is constantly updated.
That is standard practice in the USA.
*(From HowStuffWorks web-site)*

- *What information does the flight plan include?*

*11. Choose the correct answer:*

Before an airplane is allowed to takeoff the pilot must have:

A. all luggage stowed
B. flight plan clearance
C. passengers
D. none of the above

Air traffic controllers monitor a flight using:

A. radar scope
B. flight tracking strip
C. radio contact
D. all of the above

The Area Control Center is responsible for which phases of flight?

A. en route air traffic
B. taxi, takeoff, departure
C. approach and landing

The Terminal Control Center is responsible for which phase of flight?

A. cruise flight
B. approach
C. departure
D. landing
E. B and C
F. B, C and D

An airport control tower directs air traffic during which phases of flight?

A. preflight, takeoff, landing
B. preflight, taxi, takeoff
C. push back, takeoff, departure
D. takeoff, landing

The maximum number of operations which can safely fly within the air traffic system is known as:

A. flight phase
B. air traffic management
C. gridlock
D. capacity

The greatest cause of air traffic delays is:

A. not enough pilots
B. mechanical problems
C. too many airplanes
D. inclement weather

A pilot requesting permission to land at an airport would contact:

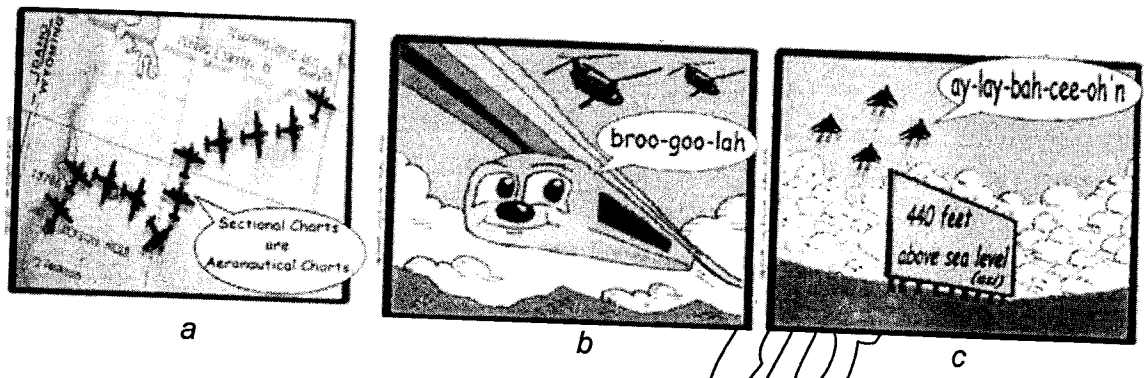
A. an ACC controller
B. a departure controller
C. a tower controller
D. a ground controller

*(From HowStuffWorks web-site)*

*12. Match definitions with pictures:*

1) The height above sea level of a given land prominence such as airports, mountains. etc.

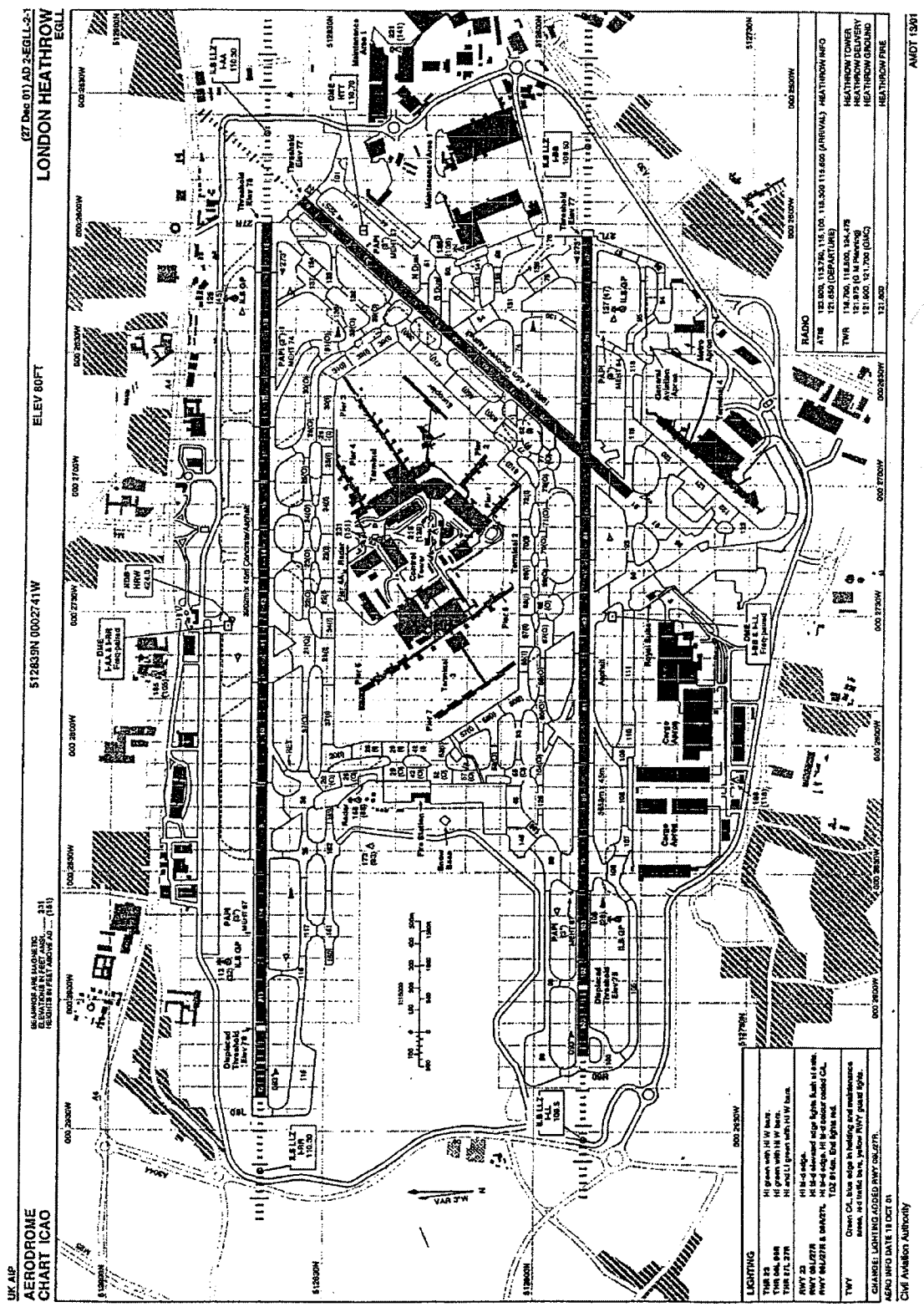
2) A map used in air navigation containing all or part of the following topographic features, hazards and obstructions, navigation aids, navigation routes, designated airspace and airports.
3) An instrument indicating direction.




*a* *b* *c*

(From "Sky Kingdom is your illustrated Aviation and Flight Simulator dictionary." *Illustrations by Captain Bill.)*

*13. Look at the chart and answer the questions of the teacher:*



- *Now make a report on the information a pilot or controller can get from an aeronautical chart*

14. **Read the text. Mark the sentences that contain information for the passengers and the ones for the aviation specialists.*

**Warsaw Frederic Chopin Airport**

Warsaw Frederic Chopin Airport is the biggest and most modern facility of its kind in Poland.
Warsaw Airport handles about 75% of the overall air passenger traffic in the country. Departing aircraft carry passengers to various countries in America, Africa, Asia and Europe.
At present, Warsaw Airport operates nearly 60 scheduled flights to/from the biggest airports worldwide and the number of its charter connections is always increasing. Passengers' favorite destinations are London, Frankfurt, Paris and Amsterdam. In terms of domestic traffic, most passengers travel to Kraków, Wrocław and Gdańsk.
Warsaw Airport is located 10km south-west of the city centre. It is situated on approximately 834 hectares. Air operations are served by two runways of the following dimensions: 3690m x 60m and 2800m x 50m. Aircraft move on 18 taxiways. Warsaw Frederic Chopin Airport has a capacity of 34 air operations per hour.
A variety of services for the convenience of passengers using Warsaw Frederic Chopin Airport are available at Terminal 1. Before departure, you may receive some information, pay bills, or have a meal in one of several catering establishments.
In Terminal 1, there are 46 check-in desks. Passengers and their baggage are checked-in by the ground personnel of two companies, LOT Ground Services or Warsaw Airport Services. Some airlines carry out their own passenger check-in.
Handling services (including baggage loading and unloading, aircraft balancing, transport of passengers on the apron, pushing-back and towing) are also provided by these two companies.
There are two runways at Frederic Chopin – 11/29 and 33/15. Each taxiway is 23m wide. Taxiways are covered by asphalt concrete surfaces and are equipped with edge, centre line, clearance bars and crossbar threshold lighting.
At present, nine parking aprons ensure 60 parking stands for planes and helicopters. Two parking stands serve to de-ice aircraft prior to take-off. The parking apron located in front of the Cargo Terminal may accommodate three aircraft.
All runways are equipped with Precision Approach Path Indicators (PAPI), and runways 11 and 33 also have Precision Approach Category II Lighting System. Navigational Aids comprise NDB, VOR, DME and Instrument landing system facilities.

- *Answer the questions:*

1) How many runways are there at the Warsaw airport? And how many magnetic directions for take-off? Parking places? Taxiways?
2) What is the pavement of the runways?
3) What services are provided at the airport?
4) What does it mean "34 operations per hour"?
5) What types of flights can be served at the airport?
6) What aircraft types can the Warsaw airport accept?

- *Work in pairs. Ask questions to get as much information about (local airdrome name) as possible.*

15. *Read the Safety Paper issued by the British CAA. Pay attention to those points that can make flying safe.*

***RT discipline***
***(For Pilots & ATC)***

The need for clear and unambiguous communication of level change and heading instructions, including the correct use of callsigns and readback requirements between Air Traffic Control (ATC) and the Flight Deck, has long been recognized as an important factor in assisting the safe and expeditious operation of aircraft. It is therefore vital that the RT discipline practiced by both pilots and controllers alike reflects this philosophy. The importance of using correct and precise standard RT phraseology and techniques cannot be over-emphasized.

**Why is RT discipline important?**
When RT discipline is relaxed, for example by the use of non-standard procedures or phraseology, misunderstandings can arise. There are many examples in the UK and throughout the world where these misunderstandings have directly contributed to fatal accidents, AIRPROX events and other safety related incidents.

**What can RT discipline achieve?**
By adhering to standard phraseology and technique, pilots and ATC can play a very important part in preventing accidents and incidents. The following tangible benefits are readily apparent:

- Standard phraseology can assist pilots in building up situational awareness of the other airspace users in their vicinity.
- By making standard reports and correctly carrying out read backs, the need for further confirmation by ATC from pilots can be reduced, leading to workload reductions and a decrease in frequency congestion.
- Potential errors by either ATC or aircrew can be detected and corrected, thus preventing potential accidents, AIRPROX events and incidents.

**What can I do to improve my RT discipline?**
The following points will help you to improve your RT discipline.

- Always aim for accurate, brief, and clear transmissions. Listen carefully to transmissions and don't just 'hear' what you expect to hear.
- Before transmitting, it is important to listen out first. Ensure that you don't interrupt a dialogue or block another transmission.
- Always use your full callsign, except where the ground station has abbreviated it.
- On first contact with ATC Centre pilots must report their actual Flight Level/Altitude and cleared Flight Level/Altitude if different. On a Standard Instrument Departure (SID) pilots must report the passing altitude, initial cleared level, and SID identification. These reports provide ATC with a safety check and level verification and allow other airspace users to build up situational awareness.
- All instructions and clearances should be passed in a clear and unambiguous manner using standard phraseology. This is especially important for heading and level instructions which should contain the correct term (Height, Altitude, Flight Level or Heading).

- Controllers should endeavor to limit the number of instructions passed in any one transmission to a maximum of three – ideally only two if practicable. Where there are large amount of numbers to be passed, then speak clearly and slowly.
- Pilots should always read back the ATS messages detailed below. Controllers should always ensure that they receive these read backs. The mandatory items are:
  - Taxi instructions
  - Level instructions
  - Heading instructions
  - Speed instructions
  - Airways or route clearances
  - Runway-in-use
  - Clearances to enter, land on, take-off on, backtrack, cross, or hold short of an active runway
  - SSR operating instructions
  - Altimeter settings
  - Frequency changes
  - Types of radar service

If you are in doubt about any transmission received, or do not receive an expected readback, then check.

*(From "CAA Safety Sense" prepared by the CAA Safety Group and National Air Traffic Services Ltd (NATS) in consultation with the British Air Line Pilots Association (BALPA)*

- *Finish the statements:*

1) *The misuse of standard phraseology can cause…*
2) *The use of standard phraseology can assist pilots and controllers in…*
3) *Incorrect abbreviation of the callsigns can lead…*
4) *On first contact with ATC unit the pilot shall report…*
5) *Any one transmission shouldn't contain more than …*

- *Work in pairs: discuss situations from your or your colleague's experience when misunderstanding in radio communications threatened flight safety.*

16. *Work in pairs Pilot – Controller or Controller - Pilot.*
    1) *Уточните у диспетчера индекс местоположения (название аэродрома);*
    2) *Запросите длину ВПП (номер) в аэропорту (название);*
    3) *Уточните превышение порога ВПП (номер);*
    4) *Запросите частоту курсового ВПП (номер);*
    5) *Запросите у пилота тип самолета и модификацию.*

## UNIT 2

### *Weather*

1. *Read the text about routine weather report and its content. Then you will answer the questions of the teacher.*

The word METAR originated from the French phrase "message d'observation météorologique régulière pour l'aviation". It is thought to be a contraction of the French words **MÉTéorologique** ("Weather") **Aviation Régulière** ("Routine"). A typical METAR report contains data for the temperature, dew point, wind speed and direction, precipitation, cloud cover and heights, visibility, RVR and barometric pressure. A METAR report may also contain information on precipitation amounts, lightning, and other information.

In addition, a short period forecast called a *TREND* may be added at the end of the METAR covering likely changes in weather conditions in the two hours following the observation.

**International METAR codes**

The following is an example METAR from Burgas Airport in Burgas, Bulgaria, and was taken on 4 February 2005 at 16:00 Coordinated Universal Time (UTC).

**METAR LBBG 041600Z 12003MPS 310V290 1400 R04/P1500N R22/P1500U +SN BKN022 OVC050 M04/M07 Q1020 NOSIG=**

- **METAR** indicates that the following is a standard hourly observation.
- **LBBG** is the ICAO airdrome code for Burgas Airport.
- **041600Z** indicates the day of the month is the 4th and the time of day is 1600 UTC time, 4:00PM Greenwich Mean Time, or 6:00PM Eastern European Time.
- **12003MPS** indicates the wind direction is from 120 degrees at a speed of 3 meters per second.
- **310V290** indicates the wind direction is varying from 310 degrees true (northwest) through 20 degrees true (east-southeast) to 290 degrees true (west-northwest).
- **1400** indicates the prevailing visibility is 1400 meters.
- **R04/P1500N** indicates the Runway Visual Range (RVR) along Runway 04 is 1500 meters and not changing significantly.
- **R22/P1500U** indicates RVR along Runway 22 is 1500 meters and rising.
- **+SN** indicates snow is falling at a heavy intensity.
- **BKN022** indicates a broken cloud layer at 2,200 feet above ground level (agl). Defines the height of cloud base.
- **OVC050** indicates an overcast cloud layer at 5,000 feet above ground level.
- **M04/M07** indicates the temperature is minus 4 degrees Celsius and the dew point is minus 7 degrees Celsius.
- **Q1020** indicates the current barometric pressure extrapolated to sea level is 1020 millibars.
- **NOSIG** is an example of a TREND forecast which is appended to METARs at stations while a forecaster is on watch. NOSIG means that no significant change is expected to the reported conditions within the next 2 hours.

- **CAVOK** abbreviation for Ceiling And Visibility Okay indicating no cloud below 5,000 feet and no cumulonimbus at any level, a visibility of 6 Statute Miles (10 km) or more and no significant weather
- = indicates the end of the METAR report.

*Work as a class. Discuss the content of weather reports.*

**2.** *Complete the table below with words from the brackets:*

| heavy | severe |
|---|---|
| - | - |
| - | - |
| - | - |

(wind shear, icing, rain, turbulence, snow, hail)

**3.** *Match pairs:*

| | |
|---|---|
| a) sky | 1) visibility |
| b) wind | 2) crystals |
| c) supercooled | 3) cells |
| d) ice | 4) shower |
| e) thunderstorm | 5) shear |
| f) volcanic | 6) patches |
| g) rain | 7) drizzle |
| h) fog | 8) fog |
| i) vertical | 9) clear |
| j) shallow | 10) ash |

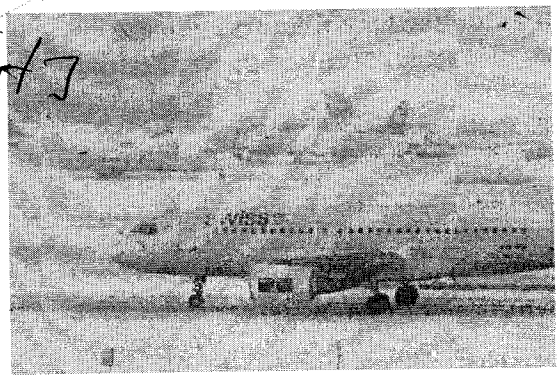
**4.** *Divide the following words into three groups:*

damp, cross, significant, calm, overcast, shear, broken, flooded, base, few, cumulonimbus, variable, surface condition, wet, surface, scattered, spot - в окруж. точке

| cloud | wind | runway |
|---|---|---|
| | | |

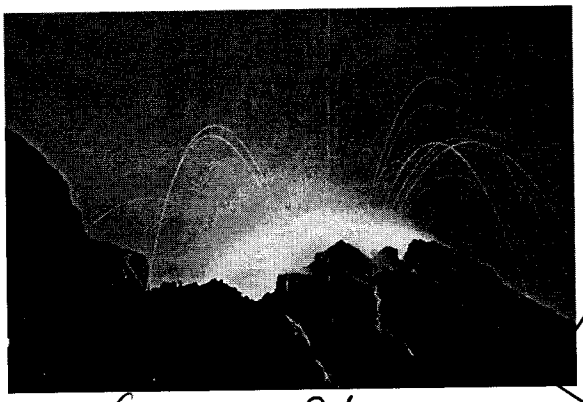
down draft - нисх. поток
updraft - восх. поток

**5.** *Look at the pictures. Guess the phenomenon. Assume where it could take place.*



A


B



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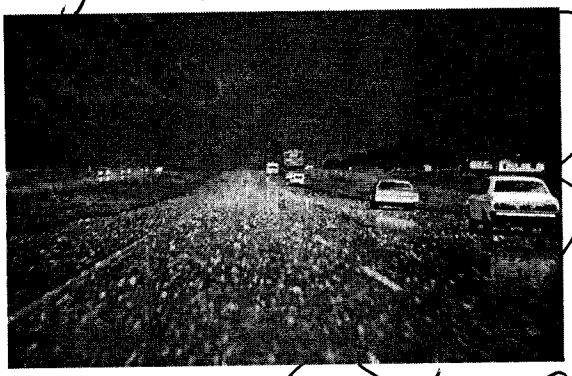


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6. *Work in groups. Recall other weather phenomena and discuss how they can affect flight safety. When all the groups have finished, compare your results as a class.*

**ATIS in Radiotelephony**

7. *Discussion. Answer the teacher's questions.*

8. *Read the text and a D-ATIS example:*

**ATIS over ACARS**

The ATIS (Automatic Terminal Information Service) is information about the airport that a pilot needs for takeoff and landing. Traditional ATIS is a broadcast message transmitted by each airport as a continuous voice transmission on a special ATIS

frequency. The pilot is required to check and copy down the ATIS information before departure and before landing.

Now ATIS is becoming available over data link at more and more airports. It is sometimes referred to as "D-ATIS" where the "D" stands for Digital or Data link.

D-ATIS has several advantages over voice ATIS:

- It is available regardless of the airplane's distance from the airport. Voice ATIS is only available within VHF range of the airport.
- The pilot gets a clear printout of the ATIS information. Poor quality of voice transmissions and accent problems are avoided.
- It saves time during a period of high workload in the cockpit.

**Example of ATIS message from Newark Airport (KEWR), USA.**

KEWR ARR ATIS O
1751Z EWR ATIS INFO O 1751Z.
16010KT 9SM FEW018
BKN080 23/18 A3008
(THREE ZERO ZERO EIGHT).
ILS RWY 22L APCH IN USE.
DEPARTING RWY 22R. RWY
11/29 CLSD. RY 22R
DEPARTURES AUTHORIZED
FROM INTERSECTION Y,
AVAILABLE DEPARTURE
DISTANCE 9 THOUSAND 5
HUNDRED AND FIFTY. READBACK ALL RUNWAY HOLD SHORT
INSTRUCTIONS. USE
CAUTION FOR BIRDS AND
CRANES IN THE VICINITY
OF EWR. ...ADVS YOU HAVE
INFO O.

*Retell the information contained in this printout in plain language.*

**9.** *Work in pairs.*
*(P) Discuss what you will prefer: monitoring broadcasting frequency for current ATIS information or receiving it over ACARS as a printout. Please sound your opinion.*
*(C) What do you do when there is no ATIS broadcast because of some technical problems?*

**10.** *Read the story in roles and answer the question:*

Ireland, Dublin airport recently, with an Air Canada B767 on final.

*Twr* "Air Canada 123, cleared to land runway 10, wind 150 degrees 10 knots."
*AC123* "Roger, cleared to land runway 10".
*A few seconds later...*
*AC123* "Dublin Tower for your information, wind at 1000ft is 220 at 30 knots".
*Twr* "Well it's lucky you are landing on the ground then".

- *What wind observations shall be given in the landing clearance?*

**11.** *What does the nomination of the runway-in-use depend on? Find a detailed answer to this question below:*

The *active runway* is the runway at an airport that is in current use for take-offs and landings. Since takeoffs and landings are usually done as close to "into the wind" as possible, wind direction generally determines the active runway (or just *the active* in aviation slang).

Selection of the active runway, however, depends on a number of factors. At a non-towered airport, pilots usually select the runway most nearly aligned with the wind, but they are not obliged to use that particular runway. For example, a pilot arriving from the east may elect to land straight in to an east-west runway despite a minor tailwind or significant crosswind, in order to expedite his arrival, although it is recommended to always fly a regular traffic pattern to more safely merge with other aircraft.

At controlled airports, the active is usually determined by a tower supervisor. However, there may be constraints, such as policy from the airport manager (calm wind runway selection, for example, or noise abatement guidelines) that dictate an active runway selection that isn't the one most nearly aligned with the wind.

- *Discuss with a partner what main factor determines the runway-in-use and why?*

**12.*** *What values do the pilots use for altimeter setting in European countries?*
- *Read the text and match appropriate Q-code (QFE, QNH and QNE) with its definition:*

**The Question of Q's**

We all tend to forget things we either have not used in a while or we don't use very often. For those of us who need a memory refresher, here are three important "Q" altimeter settings:

**Q??:** The standard altimeter setting of 29,92 inches of mercury (the contraction is Hg), 760 millimeters or 1013,25 hectopascals (hPa for short), or 1013,25 millibars (use mb). Mb and hPa are the same.
- ON THE GROUND – a variable elevation reading that is above or below actual elevation (unless the station pressure happens to equal 29,92Hg).
- IN THE AIR – positive separation by pressure, but at varying actual or true altitudes.

**Q??:** Altitude above sea level when corrections are applied for local atmospheric pressure that is above or below the standard altimeter setting of 29,92 Hg. Q?? is the altimeter setting provided in the ATIS information and by ATC.
- ON THE GROUND – the actual elevation above sea level when the aircraft is on the ground.
- IN THE AIR – the true altitude above sea level (without consideration of temperature).

**Q??:** An altimeter setting that is corrected for actual height above sea level and local pressure variations.

- ON THE GROUND – zero elevation when the aircraft is on ground. Thus, for an aircraft at the gate at Denver (actual airport elevation above sea level 5333 feet), the aircraft altimeters would read zero if set to **Q??.**
- IN THE AIR – the height above ground (without consideration of temperature).

- *Work in pairs. Airport elevations:*

UUDD –179,3m  UUEE – 192,0m  UUWW – 209,0m  EGLL – 80ft

*What will the altimeter reading be when the pilot sets QFE at UUEE (UUDD, UUWW, EGLL)?*
*What will the altimeter reading be when the pilot sets QNH at UUEE (UUDD, UUWW, EGLL)?*

**13.** * *Fill the gaps with the correct words from the brackets:*

*A cold* _____ *gripped much of Europe on Wednesday, with* _____ *snowfall shutting down* _____ *in Munich and Prague and a state of* _____ *being declared in parts of Balkans. (*heavy, emergency, front, airports.)
Nearly 200 _____ were canceled at Munich Airport after heavy _____ blanketed southern Germany and nearby countries. At least 50 flights were _____ and others were _____ to Nuremberg Airport, where the snowfall was lighter. (*rerouted, snow, delayed, flights*)
In southwest Germany, a _____ jam 30 kilometers long backed up Tuesday night on the A8 highway after tractor trailers ran into trouble on _____ roads. (*slippery, traffic*)

- *Paraphrase the following words:* shut down, cancel, blanket, reroute, delay.

**14.** * *Read the story and fill the gaps with the correct words from the brackets below:*

Dense _____ caused airlines to cancel and delay flights on Friday.

British Airways _____ 86 of its 316 European services to and from Heathrow, although long haul services are running normally.

The fog and low cloud cover are _____ Gatwick, Stansted, Luton and Southampton airports.

The fog has _____ air traffic controllers to cut the number of aircraft flying into and out of Heathrow.

A spokesman for the UK Meteorological Office said _____ at Heathrow this morning was 500 metres and temperatures were below _____, making it less likely that the fog would clear.

He said the fog would probably _____ through today and overnight, but may start to clear in southern England late tomorrow morning and tomorrow afternoon.

The airline is using _____ to transfer passengers from Heathrow to other airports in the UK and between London and Paris, Brussels and Amsterdam.

(forced, coaches, fog, visibility, freezing, remain, cancelled, visibility, affecting)

- *Match cause and effect and explain your choice using 'if' or 'when':*

| | |
|---|---|
| Temperature below freezing | delays |
| Dense fog | dense fog |
| Low visibility | low visibility |

- *Answer the questions:*

1. What precipitation can affect visibility?
2. What will happen if the visibility is below minima?
3. In what way can significant weather influence flight operation en route?

- *Make short dialogues. Imagine*

1) *you are a passenger stuck at Heathrow airport on Friday, you call your wife waiting for you at home;*
2) *you are an Airport Manager and his colleague chatting about the last night shift;*
3) *you are an Air France pilot stuck at Heathrow, you call your girlfriend who is going to meet you at the Orly Airport;*
4) *you are a Ground controller obtaining briefing from a met officer.*

**15.** *Listen to the story. Are these sentences true (+) or false (-)?*

1) The aircraft collided with terrain while executing an emergency night landing in a wheat field following a double engine failure.
2) The Learjet was in cruise over severe turbulence when it encountered thunderstorm and the No. 2 engine flamed out.
3) The aircraft began to descend and the flight crew decided to return to the aerodrome of departure.
4) During the descent, the aircraft encountered large hail, heavy rain, severe turbulence and lightning.
5) At 10,000 m No. 3 flamed out from hail and water ingestion.
6) Attempts to restart the engines were unsuccessful.
7) The investigation determined that a convective SIGMET and weather warnings weren't issued for the route of flight.
8) The aircraft sustained moderate to severe turbulence damage.-
9) None of the passengers and the crew was injured.
10) Seven passengers on board and two pilots were injured.

- *Make pairs:*

| A | |
|---|---|
| *1. issue* | ~~*a) damage*~~ |
| *2. encounter* | ~~*b) water*~~ |
| *3. execute* | ~~*c) engine*~~ |
| *4. ingest* | *d) weather warning* |
| *5. sustain* | ~~*e) thunderstorm*~~ |
| *6. restart* | ~~*f) approach*~~ |

B. 1. departure — a) rain
2. severe — b) injury
3. engine — c) aerodrome
4. heavy — d) landing
5. minor — e) failure
6. emergency — f) turbulence

- *Answer the questions of the teacher.*
- *Retell the story as if you were the captain (the co-pilot).*

**16.** *Listen and complete the gaps:*

**History repeats itself**

On May 7, 1998, a DC-9 _____ from Atlanta to Chicago _____ turbulence and _____ while climbing through 20,000 feet. The aircraft was in _____ and received substantial _____. A flight attendant was seriously _____. The flight crew was _____ around weather and was following another aircraft that went through the same area between _____.

The hail lasted about five seconds, with _____ _____ for 30 seconds. Three front windshield outer panels were shattered, with impact damage to the wing leading edge, horizontal stabilizer, and engine inlet cowls. Both _____ were also damaged as the aircraft radome separated from the aircraft and was partially ingested by the engines. Both airspeed indicators also became _____; ATC provided speed readouts every 10 to 15 seconds. The flight made an _____ _____ in Chattanooga, Tennessee.

- *Work with a partner. Ask questions to get as much information on the incident as possible.*
- *Retell the story as if you were a passenger of that flight (captain, first officer, purser or controller).*
- *Work as a class. Answer the question of the teacher:*

**17.** *Work in pairs. Make short dialogues.*

1. Р - Запросите эшелон выше, т.к. на вашем эшелоне сильная болтанка.
   С – Сообщите пилоту, эшелон выше занят и уточните, не подойдет ли ему эшелон ниже.
2. Р – Сообщите, что наблюдаете на своем локаторе грозовые засветы прямо по курсу, запросите указания по обходу грозы.
   С – Разрешите экипажу обходить по своему усмотрению, но попросите доложить, как он будет обходить.
3. Р - Сообщите диспетчеру, что у вас мало топлива и задержку принять вы не можете.
   С – Уточните запас топлива.
4. Р - Сообщите диспетчеру, что погода в пункте назначения ниже вашего минимума, запросите погоду запасного XXXX.
   С – Передайте, что XXXX закрыт чисткой ВПП. Предложите УУУУ в качестве запасного и передайте его текущую погоду.

5. C – Запросите причину отклонения от курса.
   P – Сообщите, что у вас неполадки в компьютере, запросите ветер в точке на вашем эшелоне, чтобы сравнить данные.
   Etc.

## UNIT 3

### *Administrative problems and problems linked to flight plan*

1. *Discussion. Answer the questions of the teacher.*

2. *Listen to the radiotelephony extract and answer the question: What was the cause of flight crew claim?*

3. *Work in pairs. Discuss problems linked to the flight plan and in what they can result. When all the pairs have finished, share your opinion with a class.*

### *Special Use Airspace*

4. *Read the definitions and answer the questions:*

The types of special use airspace in the USA are:

**Prohibited area**: flight is prohibited, usually for reasons of national security. Some prohibited airspace may be added or expanded via NOTAMs. For example, Prohibited Area 40 (P-40) is often expanded when the President of the United States visits Camp David in Maryland, while normally the airspace surrounding P-40 is restricted, not prohibited.

Violating prohibited airspace established for national security purposes may result in military interception and/or the possibility of an attack upon the violating aircraft, as in the case of Korean Air Lines Flight 007. Aircraft violating or about to violate prohibited airspace will often be warned beforehand on 121.5 MHz, the emergency frequency for aircraft.

**Restricted area:** According to the USA Federal Aviation Administration (FAA): "Restricted areas denote the existence of unusual, often invisible hazards to aircraft such as artillery firing, aerial gunnery, or guided missiles. Penetration of restricted areas without authorization from the using or controlling agency may be extremely hazardous to the aircraft and its occupants."

**Military Operations Area**: there is no restriction to VFR flight, although military operations in the area may be hazardous. Flight Service Station within 100 miles of the area should have information on the schedule for that area.

**Controlled Firing Area:** many pilots are not aware of these, since they do not appear on aeronautical charts. These (usually small) areas allow tests of rockets, missiles or explosives when air traffic allows.

- *Answer the questions of the teacher.*

5. *Read the text. Answer the question: What information shall be included in the NOTAMs?*

**NOTAM** is the acronym for a "Notice to Airmen". NOTAMs are created and transmitted by government agencies. A NOTAM is filed with an aviation authority to alert aircraft

pilots of any hazards en route or at a specific location. The authority in turn provides means of disseminating relevant NOTAMs to pilots.

NOTAMs are issued (and reported) for a number of reasons, such as:

- hazards such as air-shows, parachute jumps, kite flying, rocket launches, etc.
- flights by important people such as heads of state (sometimes referred to as Temporary Flight Restrictions, TFRs)
- closed runways
- inoperable radio navigational aids
- military exercises with resulting airspace restrictions
- inoperable lights on tall obstructions
- temporary erection of obstacles near airfields (e.g. cranes)
- passage of flocks of birds through airspace (a NOTAM in this category is known as a BIRDTAM)
- notifications of runway/taxiway/apron status with respect to snow, ice and standing water (a SNOWTAM)
- notification of runway/taxiway/apron status with respect to volcanic ash or other dust contamination (an ASHTAM)

Aviation authorities typically exchange NOTAMs over AFTN circuits. (*From Wikipedia*)

**6.** *Read the NOTAMs and think about:*

a) validity time of the NOTAM;
b) whom it may concern;
c) the content of the NOTAM;

*Retell the content of the NOTAMs in plain language.*

Q/CZUL/QWMLW/VI/BO/W/000/280/4537N07400W010
A) CZUL B) 9302210800 C) 9302211100
E) GUN FRNG WILL TAKE PLACE RADIUS 10 NM AROUND 4537N07400W
F) SFC G) 6100 M (20000 FT) MSL

FDC 6/0119 POC FI/P BRACKETT FIELD, LA VERNE, CA. SETER TWO ARRIVAL (SETER/ SETER 2). CORRECT FREQUENCY INFORMATION: CHANGE CHINO (CNO) ATIS FREQ TO 125.85 VICE 121.15

FDC 6/3645 LAX FI/P LOS ANGELES INTL, LOS ANGELES, CA ILS RWY 6L, AMDT 11...DELETE ALL REFERENCE TO MM. THIS IS ILS OR LOC RWY 6L, AMDT 11A.

FDC 6/5928 SAN FI/T SAN DIEGO INTL, SAN DIEGO, CA. TAKEOFF MINIMUMS AND (OBSTACLE) DEPARTURE PROCEDURES...NOTE: RWY 9, TEMPORARY CRANE 328 FT FROM DEPARTURE END OF RUNWAY, 82 FT LEFT OF CENTERLINE, 75 FT AGL/101 FT MSL. EXCAVATOR 328 FT FROM DEPARTURE END OF RUNWAY, 82 FT LEFT OF CENTERLINE, 20 FT AGL/46 FT MSL. ALL OTHER DATA REMAINS AS PUBLISHED.

7. *Read the NOTAM and answer the questions:*

1) What authority issued this NOTAM?
2) What region does it concern?
3) What aircraft are allowed to enter the territorial airspace of Iraq?
4) What may happen to an aircraft entering the affected area?
5) What frequencies shall all civil aircraft within this area monitor?
6) What equipment aboard the aircraft shall be in an operative condition all the time?

FDC 3/2646 (KFDC A0029/03) FDC PART 1 OF 4 SPECIAL NOTICE. ADVISORY FOR THE MIDDLE EAST AND THE EASTERN MEDITERRANEAN. THIS NOTICE IS EFFECTIVE IMMEDIATELY UNTIL FURTHER NOTICE.
A U.S. AND ALLIED MILITARY UNITS (COALITION MILITARY FORCES MAY OPERATE THROUGHOUT THE MIDDLE EAST AND THE AIRSPACE ABOVE THE EASTERN MEDITERRANEAN SEA, RED SEA, GULF OF ADEN, ARABIAN SEA, GULF OF OMAN, AND THE ARABIAN GULF. THE TIMELY AND ACCURATE IDENTIFICATION OF CIVIL AIRCRAFT IN THESE AREAS IS CRITICAL TO AVOID THE INADVERTENT USE OF FORCE AGAINST CIVIL AIRCRAFT. COALITION MILITARY FORCES ARE PREPARED TO EXERCISE SELF-DEFENSE MEASURES, AS MAY BE NECESSARY, TO ENSURE THEIR SAFETY IN THE EVENT THEY ARE APPROACHED BY UNIDENTIFIED AIRCRAFT (FIXED-WINGS, OR HELICOPTER).
b. IN ADDITION, THE TERRITORIAL AIRSPACE OF IRAQ IS CLOSED TO ALL NON-COALITION AIRCRAFT, EXCEPT CENTRAL COMMAND AUTHORIZED MEDICAL, FIREFIGHTING, RESCUE/RECOVERY AND HUMANITARIAN FLIGHT, UNTIL FURTHER NOTICE. AIRCRAFT ENTERING THIS AIRSPACE DO SO AT THEIR OWN RISK. COALITION FORCES ARE PREPARED TO RESPOND DECISIVELY TO ANY HOSTILE ACTS OR INDICATIONS OF HOSTILE INTENT. THIS NOTICE IS ALSO PROVIDED TO ENSURE THE SAFETY OF COALITION FORCES AND THEIR FACILITIES. ALL AIRCRAFT OR FLIGHT ACTIVITIES END PART 1 OF 4

FDC 3/2646 (KFDC A0029/03) FDC PART 2 OF 4 SPECIAL NOTICE... THAT ARE DETERMINED TO BE THREATS TO COALITION FORCES MAY BE SUBJECT TO INTERCEPTION, QUARANTINE, DISABLING OR DESTRUCTION, THIS INCLUDES AIRCRAFT WITHIN IRAQI TERRITORIAL AIRSPACE AND GROUND BASED ASSETS AND ACTIVITIES THROUGHOUT IRAQ WITHOUT REGARD TO REGISTRY.
C. THE TIMELY AND ACCURATE IDENTIFICATION OF AIRCRAFT OPERATING WITHIN THESE AFFECTED AREAS IS ESSENTIAL TO PRECLUDE .THE INADVERTENT USE OF MILITARY FORCE AGAINST CIVIL AIRCRAFT. 1. TO BETTER ENABLE U.S. MILITARY FORCES TO IDENTIFY CIVIL AIRCRAFT, ALL CIVIL AIRCRAFT FLYING WITHIN OR ENTERING THE AFFECTED AREA SHALL CONTINUOUSLY MONITOR ONE OF BOTH INTERNATIONAL EMERGENCY FREQUENCIES (VHF 121.5 MHZ AND/OR UFH 243.0 MHZ UNF) 2. WHEN AN AIRCRAFT CARRIES A SERVICEABLE TRANSPONDER, THE PILOT SHALL OPERATE THE TRANSPONDER AT ALL TIMES DURING THE FLIGHT, REGARDLESS OF WHETHER THE AIRCRAFT IS WITHIN OR OUTSIDE AIRSPACE WHERE SSR IS USED FOR ATS PURPOSES. ALL CREWS ARE REMINDED TO CONTINUOUSLY OPERATE THE SSR TRANSPONDER IN ACCORDANCE WITH THE ICAO PROVISIONS (PANS-ATM-CHAPTER8, PANS-OPS, VOL 1, PART VII AND ICAO DOC 7030 CHAPTER 8. END PART 2 OF 4

- *Retell the content of the NOTAM in plain language.*

***Particular local activities***

**8.** *Read (or listen to) short stories. Paraphrase the italicized words and word collocations. Try to explain the main idea of each story in one sentence.*

A. A British Jaguar jet fighter crashed during *military exercises* outside Fairbanks, Alaska. The pilot *ejected* safely.

B. A U.S. Army B-17 bomber killed 14 people as it crashed into the 79th floor of the Empire State Building in New York City after becoming lost in a *thick overcast.*

C. Shortly after taking off from Luke Air Force Base near Phoenix, Arizona, an F-16 jet fighter crashed. Both pilots *ejected* safely, but a truck driver on the ground suffered minor injuries when one of the *jettisoned fuel tanks* hit his pickup. The pilots had *ejected two fuel tanks* in an attempt to keep the jet airborne.

D. A U.S. Navy UH-60B Seahawk anti-submarine helicopter crashed near Lake Silverwood in the San Bernardino Mountains northeast of Los Angeles, California. All five crew members were killed.

E. Darkstar, a remote-controlled battlefield surveillance aircraft, crashed as it took off on a test flight at Edwards Air Force Base in California. The 15-foot *unpiloted spy airplane* had its *maiden flight* near the end of March.

F. A US Air Force B-1 bomber was forced to make an emergency landing at the Kadena Air Base in Okinawa after *developing engine trouble* on its way to an *air show* in Indonesia. No one was hurt in the landing.

- *Name all military aircraft types mentioned in these stories.*

**9.** *Listen to the story:*

***U.S. Pilots Reported in Sicilian Air Incident***

- *Answer the questions of the teacher.*

**10.****Write up a report on the incident as if you were*

*a) a captain of the airliner involved in such an incident.*
*b) a controller that received the claim from the captain of DC-9.*

**11.** *Discuss with a partner, what other activities in the air pilots should be aware of? When all the pairs have finished, compare your answers as a class.*

**12.** *Read the stories, guess the meaning of the italicized words from the context. Describe the circumstances of the occurrence.*

A. Clarence "Clancy" Speal, *a stunt pilot*, lost control of his airplane while *flying a loop* before thousands of people attending an air show near Pittsburgh, Pennsylvania.

After losing control, his plane went hurtling nose first into the Ohio River. He died in the crash.

B. One soldier was killed while taking part in the Big Drop training exercise near Fort Bragg, North Carolina. During the exercise, 2,900 *paratroopers* jumped at the same time, thus making the exercise one of the biggest *parachute drops* since World War II.

C. A *hot air balloon* had to make an emergency landing on a mountainside near Copper Mountain in Colorado, thus stranding the pilot and four sightseers for several hours. Rescue workers had to use caution in approaching the stranded passengers because they feared the rescue helicopter might *set off an avalanche* on the mountain.

### *Special flights*

**13.** *Work individually. Read the stories, guess the meaning of the italicized words from the context. List all activities that can be defined as 'special flights'. When everybody has finished, discuss your list as a class.*

A. Two *crop-dusters* were killed when their Turbo Thrush T-65 plane crashed during an *anti-drug training mission* in the jungles of southeast Colombia. The crash was caused by technical problems.

B. While *fighting* one of four brush *fires* raging around San Diego County, an Airborne Fire Attack *air tanker* flipped over and crashed as it attempted *to scoop water* from the San Vicente Reservoir. The two crew members were able to escape with no serious injuries.

C. A TVA helicopter *stringing an electric power line* struck and killed a worker on a 100-foot-tall *utility pole*. The helicopter then fell to the ground and crashed, thus killing two others, a pilot and a utility worker. Two others in the helicopter survived the crash, one in critical condition.

D. A helicopter *hovering over a power line tower* near DeWeese, Nebraska, suddenly *dipped*, hit the tower, and crashed. The pilot and the worker - he had just dropped off at the top of the tower - both died in the crash.

E. Leftist rebels of the National Liberation Army *shot down* a helicopter that was *ferrying soldiers* to an *oil pipeline* attacked by the rebels. The crew members were civilian employees of Helicol, the company that rented the helicopter to the army.

**14.** *Work in pairs. Discuss what aircraft types or helicopters* (ultra-lights, airliners, airships) *can be used for such special flights as* ***ILS calibration, aerial photography, highway watch, fire fighting, crop-dusting, supervision of power lines or oil and gas pipelines patrol.*** *Ground your opinion.*

### *Airport services*

**15.** *Name the Russian equivalents for the following airport services:*

Passenger handling – обслуживание пас
Cargo handling – обс. груз

Customs
Immigration service
Veterinary service
Cabin cleaning
Toilet/ water service
Crew bussing
Lost baggage delivery
VIP service
Wheelchairs, Meet and Assist Unaccompanied Minors
De-icing
Refueling
Catering
Flight-planning service
Aircraft balancing

***16.*** *Look through ATIS information and guess what operational information is about:*

Adelaide terminal information Q
**Runway:** 23
**Surface Conditions:** DAMP
**Operational Info:** CURFEW IN OPERATION UNTIL 1930. PENALTIES MAY APPLY
**Wind:** 230/20
**Visibility:** GREATER THAN 10 KM
**Weather**: SH IN AREA
**Cloud:** FEW 025. SCATTERED 030
**Temperature:** 14
**QNH**: 1011

***17.*** *Listen to the story. Are these sentences true (+) or false (-)?*

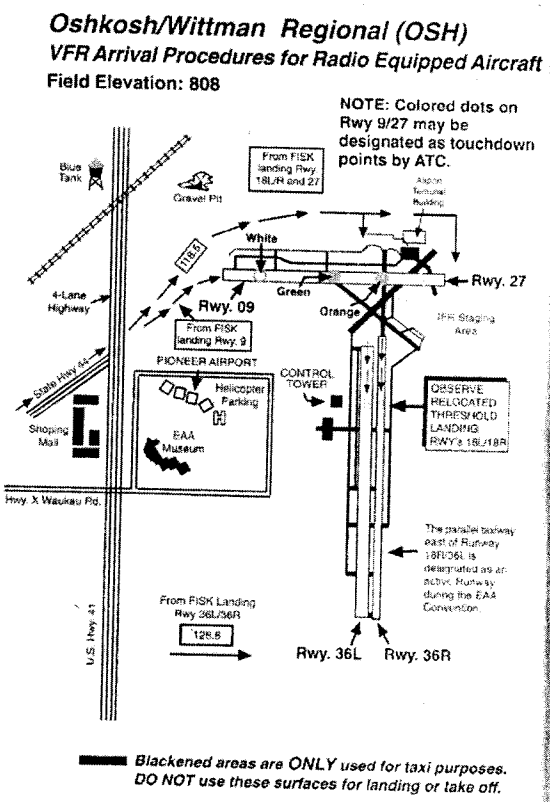
1) The aircraft crashed at 5.43 am local time while attempting to land at Tallahassee Regional Airport on a passenger flight from Memphis.
2) The Tallahassee Airport control tower was closed due to the early morning hour.
3) The flight crew received clearance from Jacksonville Center for an ILS approach to RWY 9 at 5.36 am.
4) The first impact mark was on a tree.
5) The 727 landed outside the runway and caught fire.
6) The flight crew received major injury.

- *Answer the questions of the teacher.*

***Civil engineering and prominent landmarks***

***18.*** *Work as a class. Discuss in what cases the controller can give the pilot a reference to civil engineering and prominent landmarks?*
*Look at the chart and name all objects that could be considered as landmarks while flying in VMC.*

- *(P) Do you have any experience of flying visually?*




## *Activities on the field*

***19.*** *Listen to the text.*

- *Are these sentences true (+) or false (-)?*

1) Pacific Western flight 314 was a scheduled service from Edmonton to Castlegar with stops at Calgary and Cranbrook.
2) Calgary ATC reported to the Cranbrook Aeradio station that the ETA of flight 314 was 13.05.
3) At Cranbrook, it was snowing with low visibility, and a radio equipped snow removal vehicle was sweeping the runway.
4) The Aeradio operator alerted the driver of the vehicle about incoming aircraft and gave him the ETA of 13.05.
5) The flight crew should have reported the beacon on a straight-in approach to RWY 16, but he hadn't done it.
6) The aircraft touched down at 12.55.
7) Suddenly the crew noticed a snow plough on the runway.
8) The aircraft collided with the plough.
9) The aircraft climbed to 300-400 feet, banked steeply to the left, lost height and side-slipped into the ground to the left of the runway.
10) The aircraft broke up and caught fire.

- *Answer the teacher's questions.*

## *Jobs in aviation*

***20.*** *Match aviation jobs with the definitions*

| | |
|---|---|
| a) A person who attends to the needs of passengers on a commercial flight | 1) captain |
| b) A person who examines baggage and freight for dutiable goods and contraband | 2) shuttle bus driver |
| c) A person employed to travel as an armed guard on commercial flights to protect against hijacking | 3) met officer |
| d) The member of a flight crew who is second in command to the captain | 4) station manager |
| e) The officer in command of a civil aircraft | 5) customs officer |
| f) The person who provides the flight crew with weather information before the flight | 6) escorting officer |
| g) The boss of the ground personnel | 7) baggage handler |
| h) The person on ground who guides aircraft in the air | 8) co-pilot |
| i) A person employed to handle passengers' luggage | 9) cabin attendant |
| j) The person who busses the passengers from the plane to the terminal | 10) air marshal |
| k) The person who helps the crew when they go for the first time to a foreign destination | 11) controller |

***21.*** ** Describe your area of responsibility.*

***22.*** *Listen to information and guess what activities of aviation personnel can cause disruption of flight schedule? What personnel went on strike? Describe the results of the strike.*

*Discuss as a class:*

- What kind of strikes do you know?
- Have you ever come across a strike in aviation?
- What is your attitude to this form of action?
- Will you join your colleagues if they go on strike? Ground your opinion.

***23.*** *Work in pairs. Simulate radio exchange in the following situations:*

1) Сообщите диспетчеру о том, что сопровождающий ваш самолет истребитель находится в опасной близости от вашего самолета.
2) Предупредите пилота, что в районе САРИН проходит запуск воздушных шаров.

3) Предупредите пилота, что воздушное пространство в радиусе 50 км от точки с координатами 48°17' с. ш. 046°50' в.д. закрыто для полетов из-за артиллерийских стрельб.
4) Предупредите пилота, что он вторгся в запретную зону.
5) Предупредите пилота, что аэродром XXXX закрыт из-за забастовки наземного персонала.
6) Сообщите диспетчеру, что наблюдаете лесные пожары в районе XXXX.

## UNIT 4

### *Non-routine situations in the movement area*

Spillage

1. *Read the story and answer the questions of the teacher:*

CENTENNIAL. A small plane made an emergency landing on Tuesday at Centennial Airport after its nose gear failed. South Metro Fire says a Cessna 310 made the landing at just after 5 p.m. on Tuesday, causing the plane to come to rest with its tail facing skyward.
Authorities say two people were on board but were not injured in the landing. According to South Metro Fire, there was a small *fuel leak*, but it was *cleaned up*. The airport runway was temporarily closed until the plane could be moved off the runway.

2. *Listen to the radio communication and state the problem.*

3. *Work in pairs. Make pilot-controller dialogues using the following words: fuel, oil, de-icing fluid, spillage, clean up, complete.*

Foreign objects in the movement area

4. *Read the stories and answer the teacher's questions:*

A. As the aircraft was taxiing on the apron two large *sheets of plastic blew* into number 3 *engine intake*. This was seen by ground staff who reported to ATC and the aircraft was recalled. The engine was undamaged. The sheets had blown away from a pile of *debris* which was being cleared by British Airways Authority staff from one of their contractor's sites.

B. A Volga Dnepr Boeing 747-200 freighter, freight flight from Krasnoyarsk (Russia) to Frankfurt/Main (Germany) with 3 crew and 103 tons of freight, dumped fuel and returned to Krasnoyarsk after the airport reported, they had found *tyre debris* on the runway. The landing was safe.
After landing it was established that two *tyres* of the right main landing gear had burst on takeoff with pieces *impacting* the rear fuselage.

C. An Amerijet International Boeing 727-200 freighter, freight flight M6-822 from Melville Hall (Dominica) to San Juan (Puerto Rico), *got stuck* in a *pot hole* at Melville Hall's apron. In order to *free the tyres out* of the *pot hole*, the crew increased thrust; the pressure however shattered the terminal windows. Three passengers waiting in the lounge received minor injuries from the flying glass. The three passengers were brought to a local hospital, but could be released in time to catch their flights.
Melville Hall is currently undergoing major *reconstruction works.*

**5.** *Listen to radio communications and fill in the table:*

| | What | Where |
|---|---|---|
| Exchange A | _____ | _____ |
| Exchange B | _____ | _____ |
| Exchange C | _____ | _____ |

- *State briefly the content of each dialogue using the table.*

Damage to aircraft by ramp vehicles

**6.** *Match the English and Russian equivalents:*

Ramp vehicles and equipment

a) shuttle bus, coach, bus
b) air starter unit, ASU
c) hydrant truck
d) aerodrome lavatory truck
e) cargo loader
f) ground power unit, GPU
g) tow tractor, tug, tow truck
h) hydraulic platform
i) air-conditioning truck
j) galley service truck, catering truck
k) leader van, follow me van
l) water servicing unit
m) fire truck, fire tender
n) passenger bridge, jet bridge, jet way
o) snow plough
p) maintenance stand, work stand
q) fuel tanker, fuel truck
r) ladder, crew steps

1) трап
2) топливозаправщик
3) пожарная машина
4) водозаправщик
5) машина сопровождения
6) снегоуборщик
7) автопогрузчик
8) кондиционер
9) автобус
10) стремянка
11) гидравлическая платформа
12) аэродромный ассенизатор
13) буксировщик
14) стремянка для техобслуживания
15) машина обслуживания кухни
16) установка воздушного запуска
17) аэродромный пусковой агрегат
18) установка централизованной заправки топливом

- *Describe ramp vehicles' functions. Use the following verbs for it:* is used to; is used for; is designed to; is aimed to; helps

**7.** *Listen to the story. Are these sentences true (+) or false (-)?*

1) The captain and co-pilot were conducting prefight checks preparing for a daylight flight.
2) While refueling the fuel truck struck the aircraft.
3) The rear corner of the truck penetrated about 30 centimeters into the cabin.
4) While moving during the impact the aircraft tires left rubber marks on the tarmac.

**8.** *Listen to radio communication and state the problem.*
*Work with a partner. Recall and write down all situations when pilots can cancel an original slot and request a new one. Discuss your ideas as a class.*

**9.** *Read the story; retell it in English using words given below:*

Аэропорт на мысе Шмидта, Ан-2 выруливает со стоянки и сталкивается с автобусом, который направляется к вокзалу. Водитель автобуса выскакивает на перрон и кричит пилоту: «Ты почему не включил поворотник?»

*Apron, stand, switch on, terminal, taxi out, shuttle bus driver, turn signal, Schmidt Cape, collide.*

## Return to the ramp

**10.** *Read the dialogue in roles. State the reason for return to the apron.*

P Town Ground, Sun Air 457, at holding position RWY 06, we have a sick passenger on board. We request to return to the ramp as soon as possible.
C Sun Air 457, roger, stand by one.
...
C Sun Air 457, report the A320 on final in sight.
P A320 in sight, Sun Air 457.
C Sun Air 457, after the landing A320 has passed, enter RWY 06.
P Roger, the A320 has now passed, we are entering RWY 06. Can you alert the medical services?
C Sun Air 457, we will alert the medical services. Do you know the problem?
P We are not sure, Tower. It may be a heart attack.
C Roger, Sun Air 457, taxi via RWY 06, taxiway A to stand 30. An ambulance will be there.
C Sun Air 457, copied.
...
P Sun Air 4573, RWY 06 vacated.
C Sun Air 457, contact Ground 123.8, be advised they are aware of your problem.
P 123.8, Sun Air 457.

- *Discuss with a partner what other reasons can make the crew return to the apron?*

## Runway events

**11.** *Read the definitions and fill the gaps with appropriate terms:* runway confusion, runway excursion, runway incursion.

_____ is an incident involving only a single aircraft, where it makes an inappropriate exit from the runway. This can happen because of pilot error, poor weather, or a fault with the aircraft. **Overrun** is a type of excursion where the aircraft is unable to stop before the end of the runway.

_____ involves a first aircraft, as well as a second aircraft, vehicle, or person. It is defined as: "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 takeoff of aircraft."

_____ involves a single aircraft, and is used to describe the error when the aircraft makes "the unintentional use of the wrong runway, or a taxiway, for landing or take-off".

**12.** *Listen to the story. Are these sentences true (+) or false (-)?*

1) The tower controller cleared the Boeing 727 for a night takeoff on RWY 22R.
2) The tower controller cleared Dornier Do-228 to line up and wait RWY 22R.
3) The Boeing crew saw the Dornier on the RWY and executed an early rotation.
4) There was a collision on RWY 22R.
5) The B-727 crew returned to the airport to check the engines.
6) An investigation determined that air traffic control coordination and decisions had been inadequate.

- *Answer the questions of the teacher.*

**13.** *Listen to the story for the gist.*
*Listen once again and fill the table:*

Location of the occurrence_____

| | Aircraft 1 | Aircraft 2 |
|---|---|---|
| Aircraft type | | |
| Registration | | |
| Operator | | |
| Phase | | |
| Nature | | |
| Departure airport | | |
| Destination | | |

Probable cause_____

- *Retell the story using the table.*

**14.** *Listen to radio communications, write down unknown words. After you have listened to the recording ask the teacher to clarify the meaning of unknown words.*
*Answer the teacher's questions.*
*Work with a partner:*

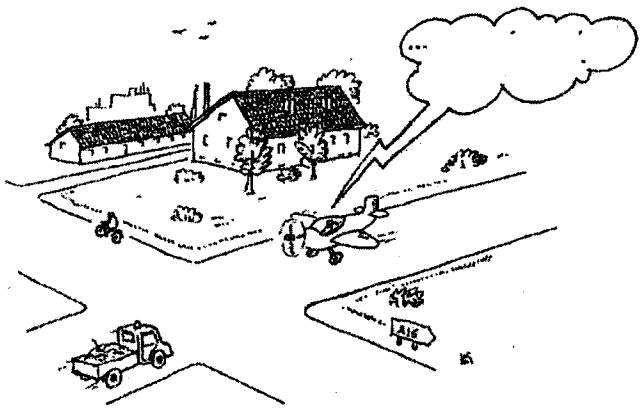
- *Recall and write down all verbs that a pilot can use in his report to the controller about runway excursion.*
- *Recall and write down all synonyms for 'to be stuck in'.*

*Discuss your results as a class.*

*15. Work in pairs.*

*Student A: read story A and answer the questions of student B.*
*Student B: ask questions to get all information on the situation told in story A.*
*And vice versa.*

***16.** Put in pilot's words. You may not use any words beginning with letters "F" or "S".*



- *Think up a story that ended like this.

Smoke from undercarriage

***17.** Listen to radio communications and answer the teacher's questions. Discuss possible causes of smoke.*

Burst tyre

***18.** Read the dialogues in roles and answer the questions:*

A)

C Palmair 666, Tower staff heard *a loud bang* on landing. We think it came from your aircraft. Confirm operations are normal.
P Roger, Tower, we *may have burst tyres* on landing.
C Palmair 666, Tower observes burst tires on your right *bogey.*
P Roger, we are unable to continue taxi. We request tow to the stand.
C BAW 351, go around from this approach, *disabled aircraft* on runway, break break, DAL 126, hold position, disabled aircraft on runway 25 at entrance to taxiway D.

B)

P We *must have* a flat tire on the nose gear, can we pull in to the right-hand side of the taxiway?
C Pull in quickly, there's Beech 99 behind you. Can you taxi in at your own or do you want to be towed?

Runway and taxiway lighting

***19.*** **Read information on airdrome lighting system.*

The first runway lighting appeared in 1930 at Cleveland Municipal Airport (now known as Cleveland Hopkins International Airport) in Cleveland, Ohio.

Runway lighting is used at airports which allow night landings. Seen from the air, runway lights form an outline of the runway. A particular runway may have some or all of the following:

- **Runway End Identification Lights (REIL).** Unidirectional (facing approach direction) or omnidirectional pair of synchronized flashing lights installed at the runway threshold, one on each side.
- **Runway End Lights.** A pair of four lights on each side of the runway. On precision instrument runways, these lights extend along the full width of the runway. These lights show green when viewed by approaching aircraft and red when seen from the runway.
- **Runway Edge Lights.** White elevated lights run the length of the runway on either side. On precision instrument runways, the edge-lighting becomes yellow in the last 2,000 ft (610 m) of the runway. Taxiways are differentiated by being bordered by blue lights, or by having green centre lights, depending on the width of the taxiway, and the complexity of the taxi pattern.
- **Runway Centerline Lighting System (RCLS).** Lights embedded into surface of the runway at 50 ft (15 m) intervals along the runway centerline on some precision instrument runways. White except last 3,000 ft (914 m), alternate white and red for next 2,000 ft (610 m) and red for last 1,000 ft (305 m).
- **Touchdown Zone Lights (TDZL).** This consists of rows of white light bars (with three in each row) on either side of the centerline over the first 3,000 ft (914 m) (or to the midpoint, whichever is less) of the runway.
- **Taxiway Centerline Lead-Off Lights.** Installed along lead-off markings, alternate green and yellow lights embedded into runway pavement. It starts with green light about runway centerline to the position of first centerline light beyond holding position on taxiway.
- **Taxiway Centerline Lead-On Lights.** Installed same way as Taxiway centerline Lead-Off Lights.
- **Approach Lighting System** or **ALS**, is a lighting system installed on the approach end of an airport runway and consists of a series of light bars, strobe lights, or a combination of the two that extends outward from the runway end.

- **Taxiway Edge Lights** are used to outline the edges of taxiways during periods of darkness or restricted visibility conditions. These fixtures are elevated and emit blue light.
- **Taxiway Centerline Lights.** They are steady burning and emit green light located along the taxiway centerline.
- **Clearance Bar Lights.** Three in-pavement steady-burning yellow lights installed at holding positions on taxiways
- **Runway Guard Lights.** Either a pair of elevated flashing yellow lights installed on either side of the taxiway, or a row of in-pavement yellow lights installed across the entire taxiway, at the runway holding position marking at taxiway/runway intersections.
- **Stop Bar Lights.** A row of red, unidirectional, steady-burning in-pavement lights installed across the entire taxiway at the runway holding position, and elevated steady-burning red lights on each side used in low visibility conditions (below

1,200 ft RVR). A controlled stop bar is operated in conjunction with the taxiway centerline lead-on lights which extend from the stop bar toward the runway. Following the ATC clearance to proceed, the stop bar is turned off and the lead-on lights are turned on.

1) *Match synonym pairs: 'fixed lights', 'blinking lights', 'flashing lights', 'steady lights'.*
2) *Divide all mentioned lights into groups:*

green red blue yellow white

- *Discussion*

1) When the approach lights are too bright and dazzle the pilots they can ask the controller for what?
2) When the visibility is low the pilot can ask the controller for what?
3) What is the most common cause of lighting system failure?

***20.*** *Fill the gaps with the words in brackets:*

South Africa
One dark moon evening, as a military controller was reading his novel in the _____ of his airfield, situated in the middle of the bush, awaiting the return of two Impala _____ from a night _____...he was suddenly shook out of his story by the jets returning early and buzzing overflying the tower by a few inches without any _____ lights on. As they pitched up to position onto a _____ for the landing the radio sounded: "Guess who?" The controller stood up from where he fell off his chair, _____ the runway and airfield _____ and replied on the radio: "Guess where?"

*(lights, navigation, tower, flight, jets, downwind, switched off)*

***21.*** *Look through the information paper. Ask your teacher to clarify the items that are unfamiliar to you.*

**General Edward Lawrence Logan International Airport – KBOS**
Boston, Massachusetts, USA

FAA INFORMATION EFFECTIVE 25 SEPTEMBER 2008

**Location**

| | |
|---|---|
| FAA Identifier: | BOS |
| Lat/Long: | 4221N / 07100W |
| Elevation: | 20 ft / 6.1 m |
| From city: | 1 mile E of Boston |
| Time zone: | UTC –4 |

| **Sunrise and sunset** | **Times for 17-Nov-2008** | |
|---|---|---|
| | **Local (UTC -5)** | **Zulu (UTC)** |
| Morning civil twilight: | 06:09 | 11:09 |

| | | |
|---|---|---|
| Sunrise: | 06:40 | 11:40 |
| Sunset: | 16:19 | 21:19 |
| Evening civil twilight: | 16:49 | 21:49 |

**Current date and time**

| | |
|---|---|
| Zulu (UTC) | 17-Nov-2008 20:28:41 |
| Local (UTC -5) | 17-Nov-2008 15:28:41 |

**Airport Operations**

| | |
|---|---|
| Airport use: | Open to the public |
| Activation date: | 04/1940 |
| Sectional chart: | NEW YORK |
| Control tower: | yes |
| ARTCC: | BOSTON CENTER |
| FSS: | BRIDGEPORT FLIGHT SERVICE STATION |
| NOTAMs facility: | BOS (NOTAM-D service available) |
| Attendance: | CONTINUOUS |
| Wind indicator: | lighted |
| Lights: | DUSK-DAWN |
| Landing fee: | yes |
| Fire and rescue: | ADFF index E |
| International operations: | customs landing rights airport |

**Airport Communications**

| | |
|---|---|
| UNICOM: | 122.95 |
| WX ASOS: | PHONE 617-567-5762 |
| BOSTON GROUND: | 121.75 121.9 |
| BOSTON TOWER: | 124.725 (HELICOPTERS) 128.8 132.225 |
| BOSTON APPROACH: | 118.25 (NORTH) 120.6 (SOUTH) 127.2 (WEST) |
| BOSTON DEPARTURE: | 133.0 |
| CLEARANCE DELIVERY: | 121.65 |
| PRE-TAXI CLEARANCE: | 121.65 |
| (ARR/DEP RY 14/32) | 128.8 |
| (ARR/DEP RYS 04R/22L 09/27) | 128.8 |
| D-ATIS: | 127.875 |
| D-ATIS (DEP): | 135.0 617-567-0160 |
| EMERG: | 121.5 243.0 |
| GATE CTL; | 134.05 |

**Airport Services**

| | |
|---|---|
| Fuel available: | 100LL JET-A |
| Airframe service: | MAJOR |
| Power plant service: | MAJOR |
| Bottled oxygen: | HIGH/LOW |
| Bulk oxygen: | HIGH/LOW |

**Runway Information** **Runway 15R/33L**

| | |
|---|---|
| Dimensions: | 10083 x 150 ft / 3073 x 46 m |
| Surface: | asphalt/grooved, in good condition |
| Runway edge lights: | high intensity |

| | **Runway 15R** | **Runway 33L** |
|---|---|---|
| Elevation: | 18.9 ft | 14.8 ft |
| Traffic pattern: | left | left |
| Displaced threshold: | 880 ft | no |
| Markings: | precision, in good condition | no |
| Runway end identifier lights: | no | no |
| Centerline lights: | yes | yes |
| Touchdown point: | yes | yes, lighted |
| Instrument approach: | ILS/DME | ILS/DME |
| Obstructions: | | 62 ft. trees, 3040 ft. from runway, 140 ft. left of centerline |

**ADDITIONAL REMARKS**

ARRESTING GEAR: ENGINEERED MATERIALS ARRESTING SYSTEM (EMAS) 158 FT IN LENGTH BY 170 FT IN WIDTH LOCATED AT DEPARTURE END OF RY 15R.

BIRDS ON & INVOF ARPT

NUMEROUS CRANES INVOF OF ARPT UP TO 250 FT. MSL.
NOISE SENSITIVE AREA - HELS OPNG WITHIN THE RESIDENTIAL AREA ARE REQD TO MAINT THE HIGHEST POSSIBLE ALT.

FOR NOISE ABATEMENT PROCEDURES CALL 617-561-1636 0900-1700 MON-FRI.

- *Work in pairs. Ask questions to get information about* location indicator of Boston airport, coordinates, elevation, time zone, opening hours, available airport services, runway pavement, markings, lighting system, obstructions, noise abatement procedure and etc.

***22.*** *Match pairs:*

*A.*

| | |
|---|---|
| a) require | 1) debris |
| b) clean up | 2) passengers |
| c) submit | 3) runway inspection |
| d) dim | 4) baggage |
| e) cool | 5) assistance |
| f) arrange | 6) flight plan |
| g) evacuate | 7) tarmac |
| h) check | 8) spillage |
| i) taxi in to | 9) lights |
| j) remove | 10)brakes |

*B.*

| | |
|---|---|
| a) draining | 1) tire |
| b) loose | 2) marks |
| c) fuel | 3) marking |
| d) approach | 4) ditch |
| e) baggage | 5) sign |
| f) burst | 6) debris |
| g) dashed | 7) spillage |
| h) rubber | 8) evacuation |
| i) direction | 9) lights |
| j) emergency | 10)mismatch |

**23.** *Match synonyms:*

| | |
|---|---|
| a) require | 1) flight deck |
| b) staff | 2) carry out |
| c) slide off | 3) luggage |
| d) perform | 4) first officer |
| e) allow | 5) personnel |
| f) tarmac | 6) activate |
| g) baggage | 7) skid off |
| h) cockpit | 8) pavement |
| i) co-pilot | 9) permit |
| j) engage | 10)need |

**24.** **Read short stories, underline key words and entitle every story in accordance with the topics of the unit:*

A. A tractor trailer truck delivering aircraft tires struck the wing of a Delta jet as passengers were boarding the plane. One of the passengers was seriously hurt when he fell to the tarmac as the jet was pushed away from the loading platform.

B. A Valujet DC-9 slid on ice into a snow bank after landing at the Dulles International Airport near Washington, DC. Nobody aboard was hurt.

C. A Delta Airlines jet slid off a snow-covered tarmac at the Salt Lake City, Utah airport. No one was injured in the incident.

D. A private Gulfstream II jet crashed into a maintenance truck while trying to land at La Guardia Airport in New York City. Neither of the two maintenance workers nor any of the passengers on the plane were hurt in the incident although the plane's right landing gear was sheared off and the plane had a bouncy landing.

E. A US Airways Express propeller plane hit a doe and two fawns as it was taking off from the Kinston, North Carolina airport. The deer were killed and the plane's right wheel and engine were damaged. The Charlotte-bound flight was cancelled.

F. A United Airlines jet backed into a plane tow truck as the jet backed away from the gate at San Francisco International Airport. No one on the plane was hurt but the tow truck driver suffered facial lacerations and was taken to the hospital. The fuselage of the plane was damaged in the rear so passengers had to be transferred to another plane to continue their flight.

***25.*** *Read the story:*

The Cargo Door
In Lome (Togo) this year, AN12 taxied towards the runway, backtracked it and started its take off roll. A cargo door opened, and then fell off onto the runway, followed by dozens of suitcases leaving a trail of broken suitcases behind the departing aircraft. As a consequence, the airport was closed for 4 hours.

- *Tell the story as if you were the pilot of the AN12 (the Tower controller).*

*26. *Read the article:*

***Midway crash inquiry begins***

Chicago Tribune
The Associated Press
Friday, December 9, 2005
*Flight 1248 from Baltimore-Washington International Airport landed at 7.14 p.m. on Runway 31 Center at Midway, but then lost control, ran off the runway, crashed through a fence and smashed into cars on Central Avenue.*
Ninety-eight passengers and five crewmembers aboard the Boeing 737-700 aircraft were *evacuated* safely.
Some passengers used *inflatable slides* to get out of the plane in the blowing snow, while others *exited* from stairs at the rear of the plane. The passengers were held for questioning by investigators for about three hours.
Two adults and three children, including the boy who died were riding in the vehicle that was pinned and were taken to hospital. Two plane passengers were treated and released from Mac Neal Hospital. A tow truck driver who stopped to help plane passengers also was treated for a foot injury and released, hospital spokeswoman said.
Midway Airport was *shut down* immediately after the crash, stranding some 600 travelers. The airport reopened at 6 a.m. today, and only minimal delays were being reported this morning.
The 737-700 is "the most up to date, next-generation version of the 737", equipped with anti-skid systems and modern braking equipment. No problems were found during a routine maintenance check Wednesday.
The plane's pilot has flown for Southwest for ten years, and *the first officer*, for more than two years. Both are based in Baltimore, and Flight 1248 was their first of the day. It originated in Baltimore and was to have continued on to Las Vegas and Salt Lake City.
Midway's runways are shorter than at some airports where Southwest operates, but Runway 31 Center's length of 6,500 feet is "certainly adequate" for a Boeing 737, the officials said.
As for the *runway's condition* during Thursday night's snowstorm – city officials said it was in fair to good condition for braking ability. The aircraft had been cleared for landing by FAA controllers, and "all we can assume is the runway was prepared for it."
The plane remains where it came to rest Thursday night, with its passengers' luggage and carry-on bags still on board.

- *Find the English equivalents for*: остановиться, потерять управление, противоюзовая система, ручная кладь, техобслуживание, тормозное оборудование, закрываться, травма стопы, минимальная задержка.
- *Paraphrase the italicized words.*
- *Answer the questions.*

1) What happened at Midway airport in December of 2005?
2) What equipment was used for evacuation of passengers?
3) Were there fatalities?
4) Was anybody injured in this accident?
5) Did Midway airport operate as usual or was it shut down?
6) What was the destination of Flight 1248? Departure airdrome? Did it have stopovers?
7) What was the length of Runway 32 Center?
8) Was it appropriate for Boeing 737?
9) Describe runway conditions and weather at the moment of the occurrence.

- *Tell the story as if you were a) the pilot-flying on that flight; b) the tower controller*

**27.** *Work in pairs. Simulate radio exchange in the following situations:*

1) вы не можете рулить сами, подломилась стойка шасси.
2) вам необходимо вернуться на перрон, у вас лишнее место багажа.
3) наблюдаете разлив масла на вашей стоянке.
4) вы просите увеличить яркость огней.
5) видите куски лопнувшей покрышки (или резины).
6) вы выкатились с РД.
7) вы будете высаживать пассажиров, и вам необходим транспорт для пассажиров.
8) вам нужен тягач, чтобы вас вытащить.
9) видели собаку на рабочей полосе.
10) видели строительный мусор на РД А4.
11) у вас перегрев тормозов, запросите пожарную машину.
12) выкатились с ВПП и увязли в грунте.
13) Вас слепят огни подхода, попросите уменьшить яркость огней.

## UNIT 5

### *TCAS, air collision, aircraft proximity, level bust*

1. *Read the story and answer the questions:*

Cessna 172 aircraft took off from Montgomery Field at 08.16h and proceeded to Lindbergh Field.
At 09.00 the Cessna pilot was instructed to maintain VFR at or below 3500ft, heading 070.
PSA Flight 182 (a scheduled passenger flight from Sacramento to San Diego via Los Angeles) was advised by the approach controller that there was traffic in front of them: 'traffic, twelve o'clock, one mile, a Cessna".
The PSA crew reported traffic in sight immediately thereafter and the PSA flight was instructed to maintain visual separation.
The crew had lost track of the Cessna and radioed back: "think he's passing off to our right".
The flight crew still weren't sure of the actual position of the Cessna.
At 09.01.28 a conflict alert warning began in San Diego Approach Control facility, indicating a collision hazard between PSA 182 and the Cessna.
At 09.01.47 the approach controller warned the Cessna pilot of traffic in the vicinity.
At the same moment both aircraft collided.
Flight 182 was descending and overtaking the Cessna, which was climbing.
The Cessna broke up immediately and exploded after colliding with Boeing's right wing.
The Boeing entered a shallow right descending turn and crashed into a residential area.

2. *Read the text:*

**ACAS/TCAS**

**Historical development of ACAS/TCAS**

Following several concept studies, the Airborne Collision Avoidance System (ACAS) was described in 1993 by the International Civil Aviation Organization (ICAO) in Annex 2 as a Standard. The advancement (ACAS II) was adopted in 1995 by the ICAO as "Standards and Recommended Practices" (SARPs).

In Europe Eurocontrol had participated significantly in the development and implementation of ACAS.

Parallel to the development of ACAS on the basis of ICAO standards, the Traffic Alert and Collision Avoidance System (TCAS) was developed in the USA. ACAS and TCAS were designed as autonomous airborne systems which are independent of navigation systems.

**Note:** *Instead of the ICAO term "ACAS" the term TCAS is mainly used in the following text, which has been introduced internationally by the American manufacturers of TCAS equipment*

An accumulation of accidents and near misses in the American airspace resulted in the mandatory installation of TCAS into civil aircraft with more than 30 seats starting already on 30 December 1993 in the USA.

In Europe the mandatory installation of ACAS was established in agreement with all Eurocontrol member states.

From 1 January 2005 on mandatory installation of ACAS into airplanes with more than 19 seats or a certificated take-off mass of more than 5 700 kg.

## Description of the system

TCAS is a warning system which functions independently of ground equipment, of the aircraft navigation equipment and of the pilots. TCAS uses the transponder (Mode C or S) of other airplanes as a source of information, it possesses its own transmitter/receiver/locator systems and computers for the fast determination of flight paths and the generation of advisories for the pilots.

Only one TCAS device is installed aboard a transport category airplane, i.e. there is no redundancy for fail-safe operation. It is permitted according to the MEL (Minimum Equipment List) to continue to operate an aircraft for up to 10 days in case of TCAS failure.

## TCAS system components

TCAS II Computer

It determines the bearing by means of direction finding via directional antenna(s). It determines the distance by analysis of the total response time, it performs airspace surveillance, intruder tracking, threat detection, avoidance maneuver determination and the generation of advisories.

There is a 3-position selector for TCAS:

1 TCAS off
2 TA only — only TA (Traffic Advisories) will be generated
3 Automatic or TA/RA — unlimited operation of TCAS

Two antennas (on top and bottom of the fuselage)

The top antenna is a directional antenna.
The TCAS transmission and reception channels are the counterpart of the transponder.
Transmission frequency: 1030 MHz to interrogate transponders
Reception frequency: 1090 MHz for the reception of transponder responses

Connection to the Mode S Transponder

Data transfer between TCAS and the Mode S transponder includes the transfer of time and direction of an RA:

The TCAS computer receives the altitude measured by the Air Data Computer via the Mode S transponder.

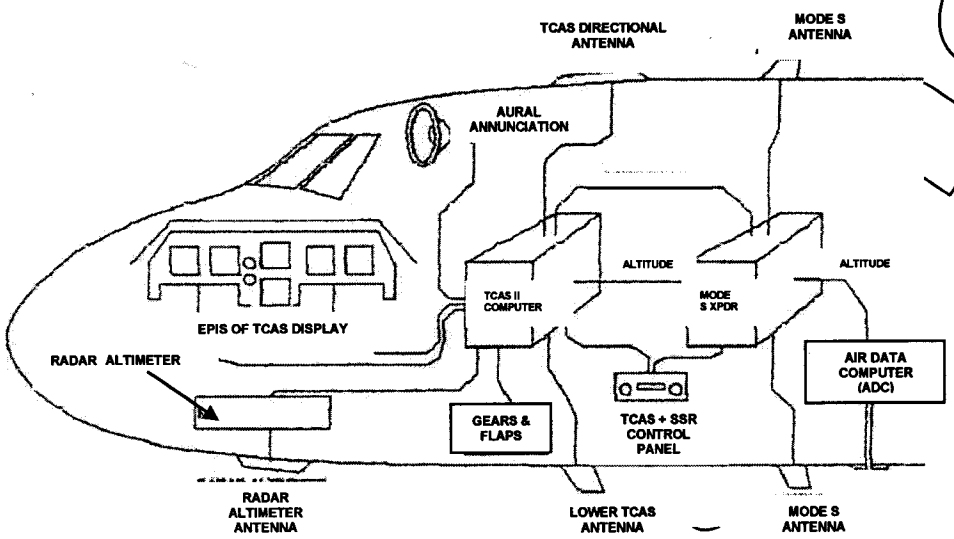
Connection to the radar altimeter

In order to prevent avoidance maneuver advisories close to the ground, the TCAS computer receives the height of the airplane above ground level determined by means of radio waves.

Loudspeaker

Alert the crew, by means of aural annunciations, of TCAS generated TAs and RAs.

The TCAS system consists of the following components:




- *Match the terms with their definitions:*

| | |
|---|---|
| a) Traffic Advisory | 1) an indication given to the flight crew recommending a maneuver intended to provide separation from all threats |
| b) ACAS | 2) a situation in which the distance between aircraft as well as their relative positions and speed have been such that the safety of the aircraft involved may have been compromised. |
| c) Resolution Advisory | 3) the conventional identifier related to specific functions of the interrogation signals transmitted by an SSR interrogator |
| d) Aircraft proximity | 4) an indication given to the flight crew that a certain intruder is a potential threat |
| e) Mode (SSR) | 5) an aircraft system based on secondary surveillance radar transponder signals which operates independently of ground-based equipment to provide advice to the pilot on potential conflicting aircraft that are equipped with SSR transponders. |

- *Work as a class. Answer the teacher's questions.*

***3.*** *Read the story and replace italicized words with synonyms:*

**Traffic Control and Out-of-date Equipment to Blame for Near Collision**

28th December. The Daily Times

Aviation experts believe that the blame for sending the Pakistan International Airlines and Air Blue aircraft into the same height lies with air traffic control, which is the responsibility of the Civil Aviation Authority.

CAA sources confirmed that the control tower was unable to guide the aircraft properly because of cloudy weather that affected the radar system. The experts, asking not to be named, said the fact that they came so close to each other was because the airlines involved have not installed latest equipment in their planes. They said that aircraft operated on domestic routes do not have the advanced version of the Traffic Alert/Collision Avoidance System (TCAS).

Sources in PIA and Air Blue confirmed that both airlines have TCAS-I in their aircraft used for domestic flights, which was invented in 1978. TCAS-II is currently in the market while TCAS-III will be marketed soon.

The TCAS system identifies the location and tracks the progress of aircraft equipped with transponders. TCAS-I is less expensive but also less capable than the others. TCAS-II is a more comprehensive system that plots *intruder* targets and is able to tell whether the aircraft is climbing, *diving*, or in level flight. Once this is determined, the system will advise the pilot to execute an *evasive* maneuver. This system costs up to $200,000 per aircraft. TCAS-III will allow pilots to execute lateral deviations to *evade* intruders and will be more accurate.

"It was just a matter of seconds between life and death," Information Minister Sheikh Rashid, who was on board the PIA Airbus, told AFP after landing.

Passengers were having dinner when the plane started jerking up and down, throwing trays and platters up to ceiling and causing general panic and *trauma*, he said.

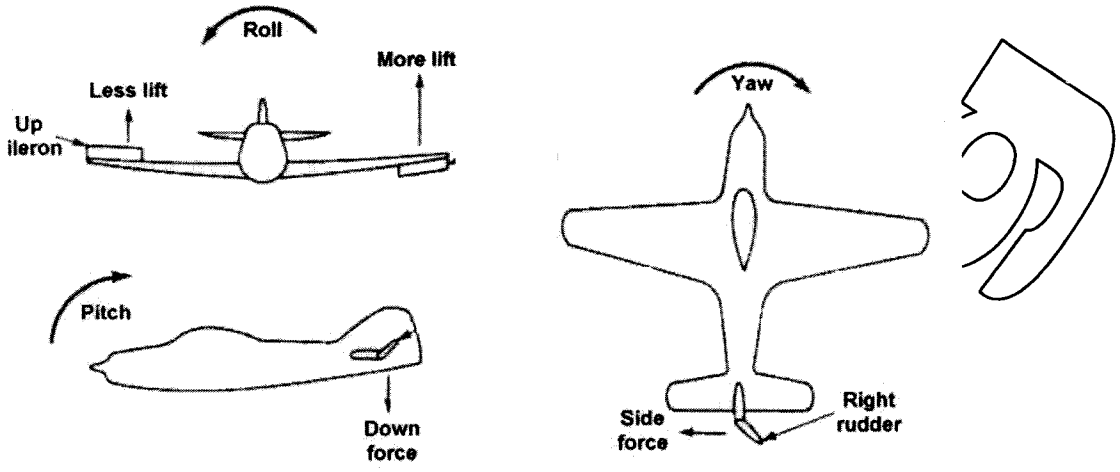
Warning signals were given to both pilots after they found themselves in the same air corridor, one was asked to *dip off*, the other was directed to *go high* but both dipped down.

A PIA *air hostess* and two passengers were injured in the resulting turbulence, while a number of travelers on the Air Blue flight suffered bruises.

Air Blue, a private carrier, said its Airbus A320 jet was flying at 11,200 meters when it "crossed another aircraft" traveling 305 meters lower than it at 8.10 pm. "No incident was reported by air traffic control during the crossing and there was no danger to the passengers on board the Air Blue aircraft at any time," company director Nasir Ali said in a statement.

a) *What caused generation of a Resolution Advisory?*
b) *Discuss with a partner differences between three TCAS versions.*

**4.** *Look at the diagram (***Jeff Scott,** Aerospace Engineer) *and describe the movements of the aircraft:*




***5.*** **Read the accident description:*

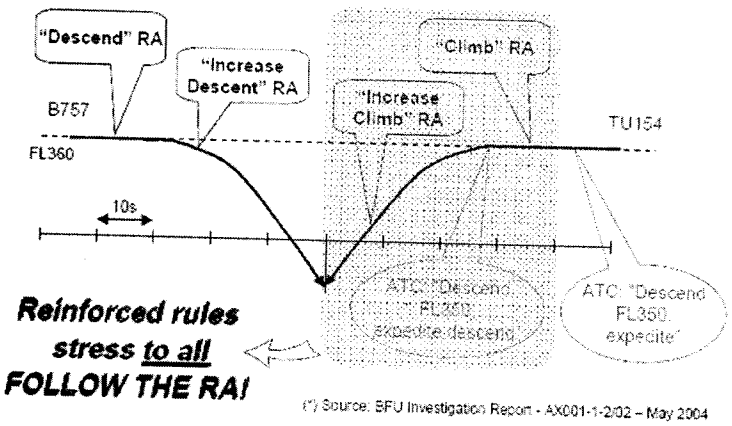
Bashkirian Airlines flight 2937 (a Tupolev 154) originated in Ufa, Russia and flew to Moscow to pick up passengers. From Moscow the aircraft continued as a charter flight to Barcelona. The flight used the RNAV-Route Salzburg - Traunstein - Kempten - Trasadingen at Flight Level 360. Communications were handed over from Munich to Zurich ACC at 23.30:11. At that moment one controller was responsible for the entire traffic in the Zurich airspace. He was monitoring two frequencies and two radar scopes. On one frequency (119,925 MHz) he was guiding one traffic for an approach into Friedrichshafen and on the other frequency (128,050 MHz) he had to control four aircraft. Between 23.25:43 and 23.33:11 LT the controller tried several times to establish contact with Friedrichshafen by phone. Because of working on the telephone net of Skyguide, the controller was not able to reach Friedrichshafen.
At 23.34:42, 50 seconds prior collision, the Tupolev's Honeywell 2000 TCAS gave a *Traffic Advisory* and seven seconds later, when radar separation was 6 miles, the radar controller issued the first descent instructions to flight 2927 to FL350: "*descend flight level 350, expedite, I have crossing traffic*". This descent was necessary for continuation of the flight to Barcelona and to achieve a vertical separation with respect to an approaching DHL Boeing 757 cargo plane. This flight was en route from Bergamo, Italy to Brussels along RNAV-Route ABESI-AKABI-TANGO at FL360. At 23.42:56 the crews of both aircraft received a *Resolution Advisory*-command from their TCAS. The DHL crew complied with this and initiated a descent, when the Tupolev crew were then trying to deal with the conflicting descent (by ATC) and climb (TCAS) instructions. Seven seconds after the *Resolution Advisory*-command, the controller repeated the instruction to descend. The Bashkirian crew then decided to follow the ATC controller's instructions. A little later the Traffic alert and Collision Avoidance System (TCAS) aboard the Boeing 757 gave the crew a Resolution Advisory (RA) to "increase descent". They then contacted ATC, telling the controller that they were doing a TCAS descent. Since both aircraft were descending, the TCAS of the Russian plane warned the crew to "increase climb" to avoid a collision. This was eight seconds before the collision. Just prior to the collision, both crews detected the other aircraft, and reacted to avoid the collision by attempting appropriate flight manoeuvres. Nevertheless, at 23.35:32 both aircraft collided at approx. FL354. The tail fin of the Boeing 757 struck the left side of the Tupolev 154 fuselage near both overwing emergency exits. The Tupolev immediately broke up in four pieces (left wing, right wing, main fuselage and tail unit including the engines). The Boeing 757 lost control and crashed 8km North of the Tupolev, just after losing both engines.

That night, from 23.00h the configuration of the radar data processing of Skyguide was modified. Thus the system was operating in FALLBACK mode. This requires among other facts, that radar separation values were increased from 5 NM to 7 NM. Also, the STCA (Short Term Conflict Alert) was not available at that time. The STCA at Karlsruhe Upper Area Control Center (UAC) however did work. From 23.33:36 on the controller of Karlsruhe UAC, tried in vain to get in contact with Zurich-ATC until 23.35:34. Between 23.33:36 and 23.34:45 the busy signal was to be heard afterwards the ringing tone. According to his statements the controller tried repeatedly to establish the connection via the priority button, but it failed.

- *Finish the sentences:*

1) Bashkirian Airlines Flight departed Moscow...
2) At 23.30.11 it was handed over...
3) At 23.34:42 the Bashkirian flight crew got...
4) The proximity aircraft was...
5) The radar controller instructed Flight 2927 to...
6) The instruction contradicted...
7) The DHL flight complied with...
8) Both aircraft collided at approximately FL354 because...

- *Describe the status of the ATC equipment of Skyguide at the moment of the occurrence.*
- *Answer the teacher's questions:*
- *Look at the diagram and comment on the statement printed in red.*




(*) Source: BFU Investigation Report - AX001-1-2/02 – May 2004

- *Work with a partner. (P) Ask questions to get information about TCAS equipment installed aboard his/her aircraft. Ask questions about TCAS events in his/her practice.*
  *(C) Discuss controller's actions while TCAS events. Ask questions about TCAS events in his/her practice.*

6. *What types of RAs were mentioned in the accident description?*

*TCAS II is designed to generate an "Adjust Vertical Speed" RA instead of a stronger "Climb" or "Descend" RA, whenever possible. This type of RA is mainly issued when an aircraft is climbing or descending to level-off 1000 ft from another aircraft.*
*Some flight crew maneuvered the aircraft opposite to the sense of an initial "Adjust Vertical Speed" RA. These wrong reactions caused altitude or level busts and losses of standard ATC separation.*

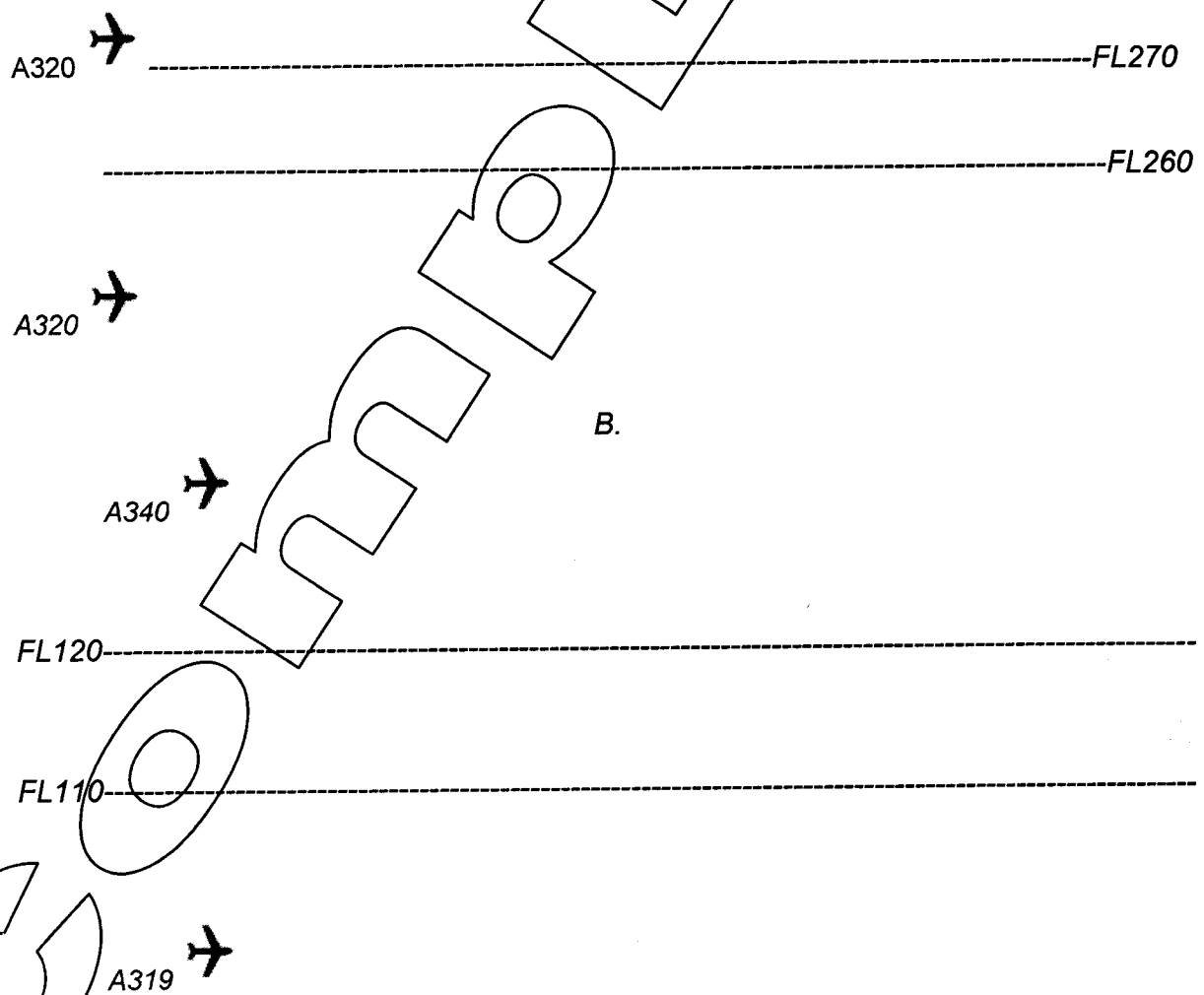
- *Listen to the stories. (The examples and diagrams are taken from Eurocontrol ACAS Program):*

- *Choose the correct answer:*

"Adjust Vertical Speed" RAs always require
1) to stop immediately climb or descent;
2) to reduce the vertical speed;
3) to increase the vertical speed.

- *Listen to the stories once again and try to visualize flight paths of the aircraft involved in these incidents. Draw the flight paths at the diagrams:*

*A.*




*B.*

- *State briefly the content of each story using the diagrams.*

7. *One of the factors that can cause an air miss or even a mid-air collision is a level bust. Read the article. If there are unfamiliar words ask your teacher to clarify them.*

06 July 2005
**Level Bust article for UKFSC magazine.**
**May 2005**
**What is a level bust?**
The Eurocontrol definition of *a level bust is an unauthorized vertical deviation of more than 300 feet from an ATC flight clearance (within RVSM airspace this limit is reduced to 200 feet)*, other states and service providers use their own definition. The use of different criteria makes a direct comparison between the numbers of reported events in each country difficult; it is also difficult to make a direct comparison with airline data for the same reason. The NATS view is that the rate of occurrence in the UK is still too high.

**What are the top causal factors in reported level bust events?**
Level bust reports are investigated by the NATS ATC Investigations staff. Based on the report, feedback from the operator and the subsequent investigation a causal factor will be assigned to the event based on the NATS Event Factor Description scheme. The top causal factors for level busts since the beginning of 2003 to date have remained broadly similar as has the proportion of events involving each causal factor. A description of the top causal factors with supporting information is given below; the figure in the end box is a guide to the % of reported events which involve each of the causal factors.



| Top causal factors of level busts, Jan 03 to Apr 05 | % of events |
|---|---|
| **Correct pilot readback followed by incorrect action,** formerly described as CRM problems. Some events in this category will involve occasions where crews have received a clearance to a level which is known to cause confusion such as FL100/FL110 or FL200/220. The UK have introduced non-standard R/T phraseology to overcome this difficulty but the problem is still with us; in 2004 there are 8 recorded occasions where a crew have correctly acknowledged a decent clearance to FL110 but have then descended to FL100. Other events will involve a breakdown in cockpit SOPs; we don't fully understand why this type of event occurs but it is possible that high R/T loading, high cockpit workload and communication issues are all contributory factors. | 20-25% |
| **Mishear errors** are recorded when an ATCO fails to detect and correct an incorrect pilot R/T read back which is audible. These errors are more common at the ATC centres with high R/T workload but we believe that ATCOs hear and correct more errors than they miss. | 10% |
| **Failed to follow cleared SID** is a particular issue with departures from Gatwick, Stansted and Luton although other airports are affected. Gatwick, Stansted and Luton all have step climb SIDs and these errors normally involve an aircraft failing to stop at the first stop altitude. | 10% |

| | |
|---|---|
| **Incorrect pilot readback by correct aircraft** involves a wrong readback of an ATC clearance. | 9% |
| **Pilot readback by incorrect aircraft** means that the crew of one aircraft took a call intended for a different aircraft. | 8% |
| **Poor manual handling** can due to a pilot's manual handling of the aircraft or input error into the FMS. Two of the most serious level bust incidents in 2004 involved poor manual handling by military pilots. | 7% |
| **Aircraft technical problem** which includes events where the FMS has failed to capture the selected altitude | 5% |
| **Altimeter setting error** is a problem mainly reported in the London TMA, 80% of the errors occur when the aircraft is in the climb, is above the transition altitude/level and the standard pressure setting isn't set. | 5% |

**What can be done about level busts by pilots?**

There is no single solution to the level bust problem because there are numerous problems.

Advice for pilots:

- ✓ Follow SOPs, full adherence to good SOPs are an excellent first defense.
- ✓ If in doubt about a clearance, confirm it on the R/T not with your colleague.
- ✓ Report your cleared level on first contact with a new frequency unless specifically asked not to.
- ✓ Maintain a good standard of R/T discipline, missing out vital information such as a cleared level or your callsign adds to controller workload because they will have to ask you for it.
- ✓ Pay attention to SID charts especially where a step climb is involved. On first contact tell the ATC sector your callsign, passing altitude, first stop altitude and SID designator.
- ✓ Increase vigilance where traffic density is high. If R/T congestion is a problem, file a report.
- ✓ If you hear another pilot make an incorrect readback and this isn't corrected by the ATCO then, whenever possible, advise ATC that you have heard a missed readback error.

One more cause should be added to the causes mentioned above. It is low temperature operation. In a standard atmosphere, the indicated QNH altitude is the true altitude. Whenever, the temperature deviates significantly from the standard temperature, the indicated altitude deviates from the true altitude, as follows:

- ✓ At extremely high temperatures, the true altitude is higher than the indicated altitude;
- ✓ At extremely low temperatures, the true altitude is lower than the indicated altitude, resulting in reduced terrain clearance. (*From Eurocontrol Level Bust Briefing Notes, ATM)*

**What should the controllers bear in mind to reduce the possibility of level busts?**

A message from the controller may be misunderstood, or a pilot may take a clearance intended for another aircraft. This is especially likely in the following circumstances:

- ✓ Frequency congestion (perhaps leading to the controller speaking too quickly);
- ✓ Long clearances, containing several pieces of information that may be confused (e.g. flight level [FL], speed, or heading);
- ✓ ICAO considers as potential source of error:

- ✓ Blocked or simultaneous transmissions;
- ✓ Late clearances (leaving insufficient time for pilots to re-brief to take account of the
  - changes);
- ✓ Language difficulties (including the use of colloquial expressions); and/or,
- ✓ Non-standard phraseology, including abbreviation of callsigns and messages.
- ✓ Most level busts are the result of an action or omission in the cockpit. However, the action of the controller can sometimes result in a level bust.
- ✓ The most likely scenario is that the controller issues a late re-clearance to an aircraft to stop its climb or descent. The pilot receives the reclearance too late to comply and overshoots his level.
- ✓ The controller should monitor the rate of climb or descent of aircraft to ensure that it is consistent with the clearance. In this way, it should be possible to issue a re-clearance in sufficient time to prevent a level bust.

**Advice for ATCOs;**

✓ File a report on any level bust even if separation is not lost.
✓ Monitor readbacks, insist on correct readbacks.
✓ R/T loading is a factor in level busts and other incidents. Split sectors to reduce R/T loading.
✓ If pilots don't give their cleared level on first contact then ask them to confirm it.
✓ Avoid multiple instructions; ideally don't include more than 2 instructions per transmission.
✓ Use clear and unambiguous phraseology.
✓ Avoid reference to level if giving traffic information, use 'traffic crossing, 1000 feet above/below.'

**8.** *Work in groups. Discuss level bust risk factors 1) during arrival; b) during departure; 2) linked to communications; 3) during low temperature operation.*

**9.** *Work in pairs. Make short pilot – controller dialogues:*

1) *C - Сообщите пилоту, что они проскочили заданный эшелон, узнайте почему.*
   *P - Скажите, что проскочили эшелон из-за высокой температуры (+34°C).*
2) *C - Спросите пилота о несанкционированном снижении, ему было разрешено снизиться до эшелона 210, а не 190. Указание снижаться до эшелона 190 предназначалось другому борту их компании.*
   *P - Скажите, что вы, наверное, перепутали позывные из-за накладки в передаче.*
3) *C - Скажите экипажу, что ответчик показывает эшелон 215 вместо заданного 210. Скажите, чтобы экипаж проверил установку высотомера и подтвердил эшелон 210.*
   *P - Скажите, что неправильно установили высотомер, теперь у вас эшелон 210.*
4) *P - Скажите диспетчеру, что из-за забитой передачи вы не расслышали назначенный эшелон. Уточните, правильно ли, что вам разрешен набор до эшелона 180.*
   *C - Скажите, что неправильно, разрешен первоначальный набор до абсолютной высоты 8000 футов.*

*P - Дайте подтверждение в виде квитанции и попросите бесступенчатый набор.*

***10.**Read the story and replace italicized words with synonyms:*

***Passenger plane "seconds from disaster" over London***

A packed jumbo jet was forced into a series of steep *dives* over London by instrument failure. The aircraft *dropped* to its minimum *permitted* altitude of 1,200 feet.
There was panic on board among more than 450 passengers and crew as the plane began its landing approach 10 miles east of Heathrow. The pilot had to *disconnect* the autopilot of the Boeing 747 and put it into a climb to 1,800 feet.
He reestablished control and had to switch to manual to land. A report today into the incident says the jumbo's control panel was showing "progressive fly down commands and the autopilot was attempting to pitch the aircraft's nose down to follow these indications".
Seconds later a *warning* of "glide scope failure", which gives the height of the jet, appeared on the screen with the warning "no auto land".
The co-pilot immediately tried to contact air traffic control to find out if there was a *fault* with the glide scope – but he could not get through because of radio congestion.
The air traffic controller had also noticed the "unusually low altitude" as the plane *dropped* and immediately ordered the Boeing to climb again.
As the flight crew taxied the jet towards its parking stand they reported to air traffic control that the glide scope "had fluctuated".
A warning was immediately sent out by air traffic control to other approaching aircraft to see if they were experiencing similar problems but none did. The incident happened on 10 January just after midday.
However, monitoring equipment on the ground showed no fault and no cause could be found for the error recorded on board the aircraft.
The Investigations Branch says it was not aware of any similar dramas immediately after event.
Two years ago Prince Charles's plane was involved in a *near-miss* with an Airbus. Charles was flying in his private jet to Spain when it came within 900 feet of an Airbus A321 with 186 passengers on board. Aer Lingus said the Airbus had been flying under the control of London air traffic control at the time.

- *Answer the questions:*

1) What aircraft movements were caused by equipment failure?
2) Is an auto landing possible in case of equipment failure?
3) What sort of fault was it?
4) What other failures can aircraft proximity cause?

- *Tell about an air miss from your or your colleague's experience. Base your narration on the following plan:*

1) Where did it take place?
2) When did it happen? At what stage of flight?
3) Was it a TCAS event?
4) Did the pilot get aural TCAS announcements?
5) What was proximity traffic?
6) What was the cause of the near miss?

**11.** *Look through the incident report.*

Please forward written form to:

[illegible] Bureau

FAX xxxxxxxxxxx

# AIR TRAFFIC INCIDENT REPORT FORM
## (for pilot)

| 1 Airprox | Procedure | Facility | TCAS/ACAS |
|---|---|---|---|
| ☐ | ☒ | ☐ | ☐ |

**2 Radio callsign of reporting aircraft:** VNC711

| Date and time of incident: | Pilot: | Aircraft registration |
|---|---|---|
| 26/05/04 0815 UTC | D. ROTH / P. HEINE | HA-IRZ |
| **Time in min./sec. elapsed between first sighting and closest proximity:** | **Avoiding action:** | **If yes, based on TCAS** |
| _____ | yes ☐ no ☐ | yes ☐ no ☐ |
| **Type of aircraft:** | **Aerodrome of departure:** | **Aerodrome of destination:** |
| CL 604 | UAAA | UZZZ |
| **In communication with:** | **FIR and/or country:** | **Frequency:** |
| CITY APPROACH | CITY OF M. | 118.1 + 127.2 |
| **Radar identified:** | **Traffic information received:** | **Transponder/SSR code:** |
| Yes ☒ no ☐ | yes ☒ no ☐ | _____ |

| 3 Position | HDG or route | TAS |
|---|---|---|
| OVER CITY OF M. | SEE DRAWING | 180 kts |

**4 FL, altitude or height**

| 1) At time of incident | Level flight | Climb | Descent |
|---|---|---|---|
| 1500 m/~~ft/FL~~ | ☒ | ☐ | ☒ |

| 2) At first sighting: | Level flight | Climb | Descent | Altimeter setting: |
|---|---|---|---|---|
| _____ m/ft/FL | ☐ | ☐ | ☐ | _____ hPa |

**5 Flight weather conditions** 1) In general: IMC ☒ VMC ☐

| 2) In particular: | On top | Below clouds | In clouds | Between layers | In and out of clouds | sky clear |
|---|---|---|---|---|---|---|
| | ☐ | ☐ | ☒ | ☐ | ☒ | ☐ |

| 3) Distance from clouds | Vertical: | Horizontal: | Sky coverage: |
|---|---|---|---|
| | _____ m/ft | _____ m/ft/NM | |

| 4) Flight visibility | Into sun | Out of sun | In haze | Remarks: |
|---|---|---|---|---|
| | ☐ | ☐ | ☐ | |

_____ km/NM

6 **Description of other aircraft** 1) Registration/RTF call sign 2) Type of aircraft

3) Markings, colours and/or lights: Camouflage: ☐ Yes ☐ no 4) Shape:

5) Low wing ☐ High wing ☐ Shoulder wing ☐ 6) Number and position of engines: 7) Estimated heading Turning left Turning right

8) Level flight ☐ Climb ☐ Descent ☐ 9) Other relevant information: SSR code:

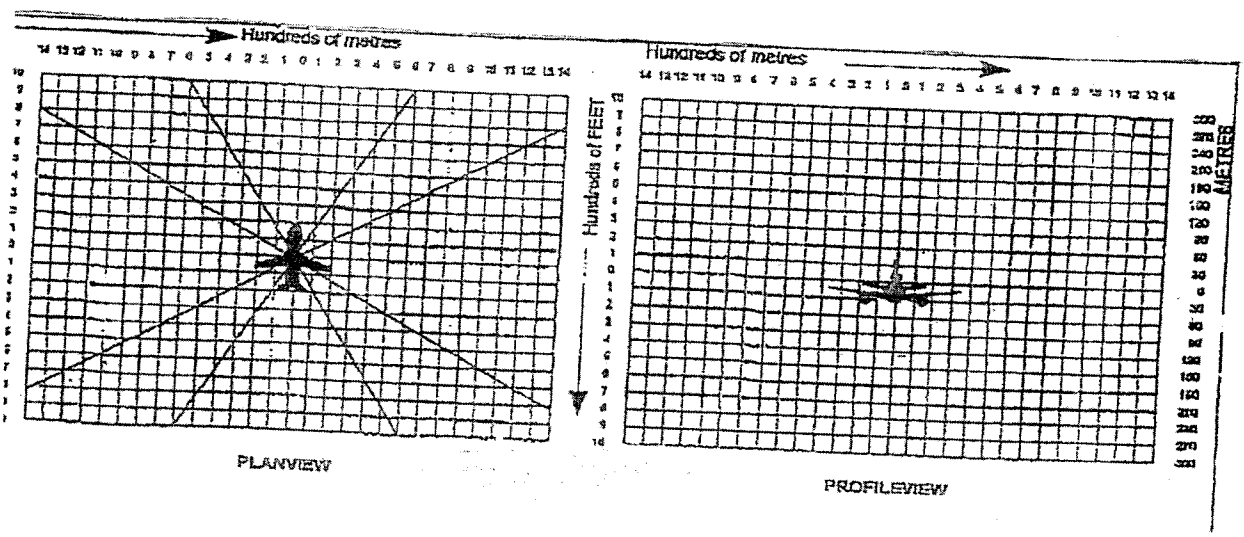
7 **Description of incident**

In case of airprox: including relative flight path, vertical and horizontal distance to other aircraft at first sighting and at time of incident, executed and/or observed avoiding actions

SEE ATTACHED SHEET

8 **Pilot's judgment:** Risk of incident was: high ☒ low ☐ none ☐

9 **Information from ATC Unit:** 1) Traffic information issued: ☐ Yes ☐ no 2) Information issued: Direction Distance Heading

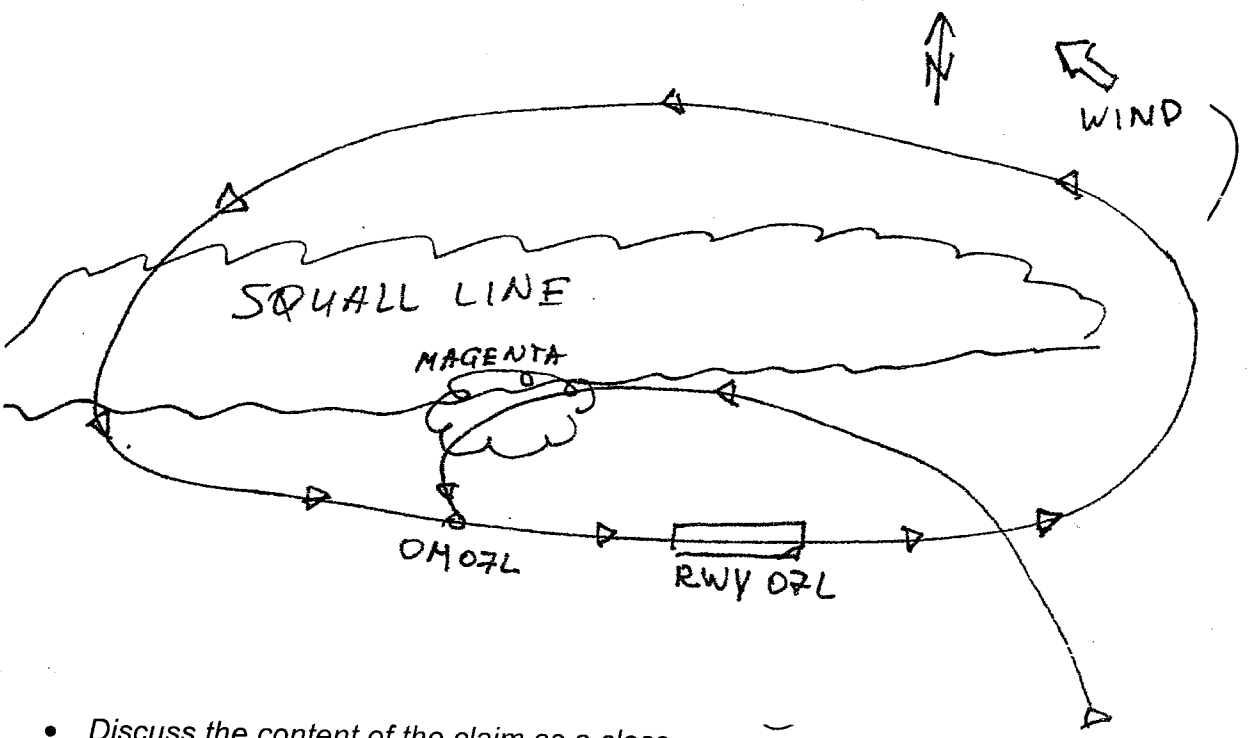



Signature of reporting person P. Hearn Date 28/05/04

**Incident report**

| | |
|---|---|
| Date | 26.08,04 |
| Time | 0815-0850z |
| Location | UZZZ |
| Conditions | daylight, IMC, turbulence (CB), partially icing |
| Frequencies | City Approach 118.1 (mainly) and City App 127.2 |
| ATIS UZZZ | INFO S 0745Z ILS 07L WET, BA GOOD, TL1800M, 050/9G13MPS 9999 OVC340CB 13/12 QFE979 NOSIG= |
| TAF UZZZ | 252145Z 260024 34005MPS 4000 RA BR BKN010 SCT020CB TEMPO 0012 VRB14MPS 1200 BR TSRA SCT003 OVC005 SCT015CB TEMPO 1224 1200 TS SHRA BR SCT004 OVC007 SCT015CB PROB40 TEMPO 1224 TSRA= |
| Work distribution | PF: P. Heine PNF: D. Roth |
| Type of flight | ferry, Flight crew + 1F/A on board |

We were descending towards UZZZ (northwesterly heading) on left hand radar vectors for an ILS approach to RWY 07L. ATC cleared us down to FL 1800m. Right over the north part of the city was severe weather activity with strong (magenta) echoes on the radar. We were vectored right into the magenta area and diverted to the left (south) with approval of ATC. From northwest of the airport, we were told to proceed direct to the OM (direction southeast). On this track, we asked several times for further descent, but ATC kept us at FL1800m. ATC wanted us to turn left for vectors, but we did not want to turn into the squall line, leading all the way north of the airport for distance of a least 40NM. We asked several times for a vector to the south (right hand downwind) which was partially VMC with some scattered clouds. But ATC denied the request and absolutely wanted us to turn left, despite our remarks, that there was severe weather. After about 15NM flying to the east, away from the field, we found a gap in the line which brought us behind (downwind of) the weather. We continued flying towards the west (downwind leg) for a new line up. The squall line showed uninterrupted magenta and red echoes. ATC wanted us to turn left into the weather all the time and ignored our remarks about magenta echoes. After 40NM, we found a gap in the weather with yellow and partly red echoes. We decided to penetrate there. Precipitation in the cloud was heavy. South of the squall line, conditions were VMC. The remainder of the flight and the landing was uneventful. The whole maneuver took us approximately 30 min. As we had enough fuel on board, endurance was not an issue.




- *Discuss the content of the claim as a class.*

***12.*** **Recall any incident (TCAS event or level bust) from your practice. Fill in the incident report form and describe the event.*

***13.*** **Read the text and answer the teacher's questions:*

**Air traffic control** (**ATC**) is a service provided by ground-based controllers who direct aircraft on the ground and in the air. A controller's primary task is to separate certain aircraft — to prevent them from coming too close to each other by use of lateral, vertical and longitudinal separation. Secondary tasks include ensuring safe, orderly and expeditious flow of traffic and providing information to pilots, such as weather and navigation information.

In many countries, ATC services are provided throughout the majority of airspace, and its services are available to all users (private, military, and commercial). When controllers are responsible for separating some or all aircraft, such airspace is called "controlled airspace" in contrast to "uncontrolled airspace" where aircraft may fly without the use of the air traffic control system. Depending on the type of flight and the class of airspace, ATC may issue instructions that pilots are required to follow, or merely flight information (in some countries known as advisories) to assist pilots operating in the airspace. In all cases, however, the pilot in command has final responsibility for the safety of the flight, and may deviate from ATC instructions in an emergency.

### *Approach and Terminal Control*

Many airports have a radar control facility that is associated with the airport. In most countries, this is referred to as Approach or Terminal Control while every airport varies, terminal controllers usually handle traffic in a 30 to 50 nautical mile (56 to 93 km) radius from the airport. Where there are many busy airports in close proximity, one single

terminal control may service all the airports. The actual airspace boundaries and altitudes assigned to a terminal control are based on factors such as traffic flows, neighboring airports and terrain, and vary widely from airport to airport: a large and complex example is the London Terminal Control Centre which controls traffic for five main London airports up to 20,000 feet and out to 100+ nautical miles.

Terminal controllers are responsible for providing all ATC services within their airspace. Traffic flow is broadly divided into departures, arrivals, and overflights. As aircraft move in and out of the terminal airspace, they are handed off to the next appropriate control facility (a control tower, an en-route control facility, or a bordering terminal or approach control). Terminal control is responsible for ensuring that aircraft are at an appropriate altitude when they are handed off, and that aircraft arrive at a suitable rate for landing.

## En-route, Center, or Area Control

ATC provides services to aircraft in flight between airports as well. En-route air traffic controllers issue clearances and instructions for airborne aircraft, and pilots are required to comply with these instructions. Controllers adhere to a set of separation standards that define the minimum distance allowed between aircraft. These distances vary depending on the equipment and procedures used in providing ATC services.

As an aircraft reaches the boundary of a Center's control area it is "handed off" or "handed over" to the next Area Control Center. In some cases this "hand-off" process involves a transfer of identification and details between controllers so that air traffic control services can be provided in a seamless manner; in other cases local agreements may allow "silent handovers" such that the receiving center does not require any co-ordination if traffic is presented in an agreed manner. After the hand-off, the aircraft is given a frequency change and begins talking to the next controller. This process continues until the aircraft is handed off to a terminal controller ("approach").

***14.*** *Listen to the story first for the gist and write down following information while listening for the second time:*

*Aircraft type* -
*Registration* -
*Flight number* -
*Departure airdrome* -
*Destination* -
*VOR/DME approach procedure* -
*Missed approach procedure* -

- *Work as a class. Discuss type of approach performed by DC-10, missed approach procedure and radar facilities available at that moment at Palermo airport.*
- *Tell the story as if you were an eyewitness of the accident (fisherman).*

***15.*** **Read the text about modern technologies used in air traffic control systems:*

## Technology

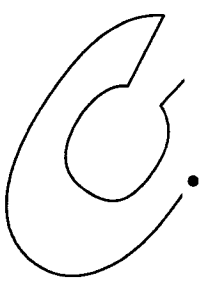
Many technologies are used in air traffic control systems. Primary and secondary radars are used to enhance a controller's "situational awareness" within his assigned airspace — all types of aircraft send back primary echoes of varying sizes to controllers' screens as radar energy is bounced off their skins, and transponder-equipped aircraft reply to secondary radar interrogations by giving an ID (Mode A), an altitude (Mode C) and/or a unique callsign (Mode S). This results in a large amount of data being available to the controller: a map of the area, the position of various aircraft, and data tags or radar labels that include aircraft identification, speed, heading, and other information described in local procedures. Certain types of weather may also register on the radar screen.

These inputs, added to data from other radars, are correlated to build the air situation. Some basic processing occurs on the radar tracks, such as calculating ground speed and magnetic headings.

Other correlations with electronic flight plans are also available to controllers on modern operational display systems.

Some tools are available in different domains to help the controller further:

- ✓ Conflict Alert (CA): a tool that checks possible conflicting trajectories and alerts the controller. The most common used is the STCA (Short Term CA) that is activated about 2 minutes prior the loss of separation. The algorithms used may also provide in some systems a possible vectoring solution, that is, the way to turn or descend/climb the aircraft in order to avoid infringing the minimum safety distance or altitude clearance.
- ✓ Minimum Safe Altitude Warning (MSAW): a tool that alerts the controller if an aircraft appears to be flying too low to the ground or will impact terrain based on its current altitude and heading.
- ✓ System Coordination (SYSCO) to enable controller to negotiate the release of flights from one sector to another.
- ✓ Area Penetration Warning (APW) to inform a controller that a flight will penetrate a restricted area.
- ✓ Mode S: provides a data downlink of flight parameters via Secondary Surveillance Radars allowing radar processing systems and therefore controllers to see various data on a flight, including airframe unique id, indicated airspeed and flight director selected level, amongst others.
- ✓ CPDLC: Controller-Pilot Data Link Communications allow digital messages to be sent between controllers and pilots, avoiding the need to use radiotelephony. It is especially useful in areas where difficult-to-use HF radiotelephony was previously used for communication with aircraft, e.g oceans. This is currently in use in various parts of the world including the Atlantic and Pacific oceans.
- ✓ The Extended Computer Display System (EXCDS): A system of electronic flight strips replacing the old paper strips. EXCDS allows controllers to manage electronic flight data online using touch-sensitive display screens resulting in fewer manual functions and a greater focus on safety. The system has also been sold to the Air Navigation Services Providers in the United Kingdom and Denmark.

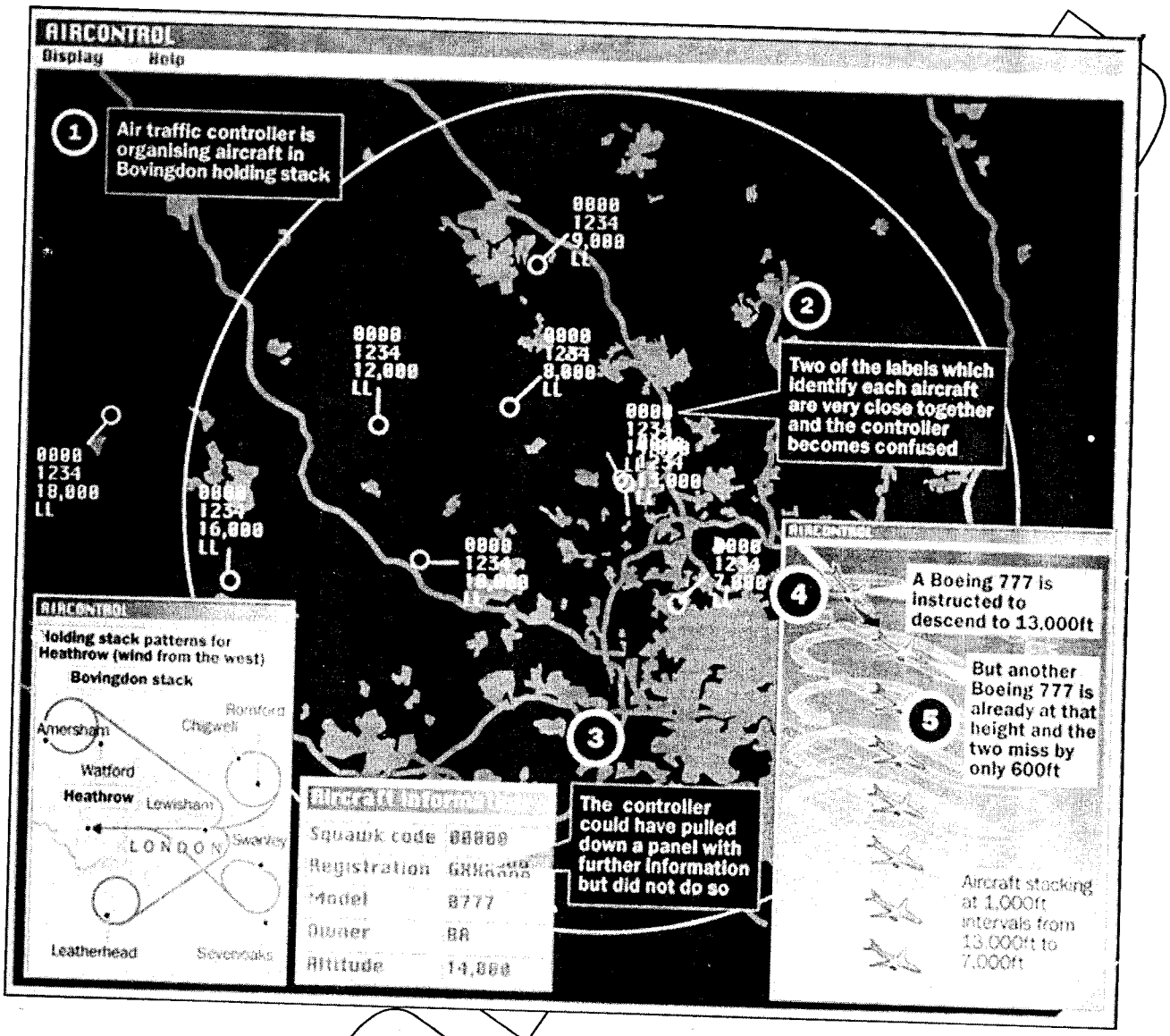


- *Answer the teacher's questions.*

***16.*** *Read the story and answer the questions:*

Two airliners carrying a total of 500 passengers came within seconds of colliding because of a flaw in the radar system used by air traffic controllers, according to a safety investigation.
A controller mistakenly ordered a United Airlines jet to descend into the path of a British Airways aircraft after becoming confused by overlapping labels on his radar screen.
The labels show each aircraft call sign, its height and the airport to which it is heading. The aircraft, both Boeing 777s, were bound for Heathrow but had been directed into a holding pattern over Chesham in Buckinghamshire, known as the "Bovingdon stack".
There were so many aircraft in the stack that the controller, based at West Drayton, near Heathrow, was unable to distinguish between them. He mistook another aircraft at 12,000ft for the BA aircraft which was at 13,000 ft. He then ordered the United Airlines aircraft to descend to 13,000 ft into what he wrongly believed was empty airspace. Within 40 seconds, the vertical distance between the two planes had reduced to only 600 ft, breaching the minimum safety gap of 1,000 ft.The aircraft would have come much closer if it had not been for the collision avoidance system on the BA jet which ordered the pilot to dive.
An alarm on the controller's desk also began buzzing and he ordered the United Airlines aircraft to climb. But the close proximity of other planes in the stack meant there was little room in which to recover. Other aircraft received a series of collision alerts in a "domino effect" which rippled down the stack.
The board found that the problem of overlap in the incident over Chesham had been heightened by the size of the airspace being monitored by the controller. Normally, controllers cover only one sector measuring 45 miles across, but the area is widened if not enough staff are available. On this occasion the controller was covering 65 miles of airspace. The controller involved in the near miss had been suspended but was allowed to return to work after re-training.
Air traffic controllers are under intense pressure between 6am and 7am because airlines try to squeeze in as many flights as possible immediately after the noise restrictions at Heathrow are lifted at 6am. Many aircraft arrive over London just before 6am and spend up to 45 minutes circling before being given permission to land.

- *Look at the picture and answer the questions:*




- *Describe your area of responsibility.*

***17.*** *Compare descriptions of information available on the radar screen at Palermo airport in 1978 and information that the controllers can obtain nowadays.*

***18.*** *Think over when the pilot can request air speed or heading readout from the controller. Discuss it in pairs.*

***19.*** *Work in pairs. Imagine a controller-pilot dialogue when the controller gets*

- *a STCA alert;*
- *a Minimum Safe Altitude Warning;*
- *an Area Penetration Warning.*

# AIR TRAFFIC INCIDENT REPORT FORM
## (for pilot)

1 Airprox ☐ Procedure ☐ Facility ☐ TCAS/ACAS ☐

2 Radio callsign of reporting aircraft: _____

Date and time of incident: _____ UTC

Pilot: _____

Aircraft registration _____

Time in min./sec. elapsed between first sighting and closest proximity: _____

Avoiding action: yes ☐ no ☐

If yes, based on TCAS yes ☐ no ☐

Type of aircraft: _____

Aerodrome of departure: _____

Aerodrome of destination: _____

In communication with: _____

FIR and/or country: _____

Frequency: _____

Radar identified: Yes ☐ no ☐

Traffic information received: yes ☐ no ☐

Transponder/SSR code: _____

3 Position _____

HDG or route _____

TAS _____ kts

4 FL, altitude or height

1) At time of incident _____ m/ft/FL Level flight ☐ Climb ☐ Descent ☐

2) At first sighting: _____ m/ft/FL Level flight ☐ Climb ☐ Descent ☐

Altimeter setting: _____ hPa

5 Flight weather conditions

1) In general: IMC ☐ VMC ☐

2) In particular: On top ☐ Below clouds ☐ In clouds ☐ Between layers ☐ In and out of clouds ☐ sky clear ☐

3) Distance from clouds Vertical: _____ m/ft Horizontal: _____ m/ft/NM Sky coverage:

4) Flight visibility _____ km/NM Into sun ☐ Out of sun ☐ In haze ☐

Remarks:

## 6 Description of other aircraft

1) Registration/RTF call sign _____

2) Type of aircraft _____

3) Markings, colours and/or lights:

Camouflage: ☐ Yes ☐ no

4) Shape:

5) Low wing ☐ High wing ☐ Shoulder wing ☐

6) Number and position of engines:

7) Estimated heading
Turning left Turning right

8) Level flight ☐ Climb ☐ Descent ☐

9) Other relevant information:

SSR code:

## 7 Description of incident

**In case of airprox: including relative flight path, vertical and horizontal distance to other aircraft at first sighting and at time of incident, executed and/or observed avoiding actions**

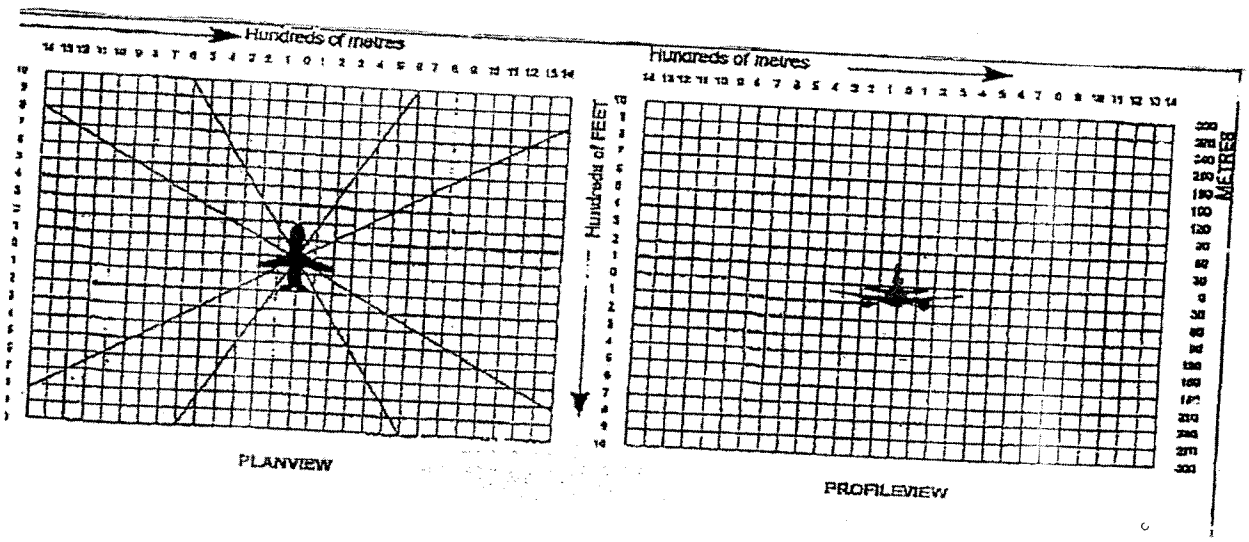
## 8 Pilot's judgment:

Risk of incident was: high ☐ low ☐ none ☐

## 9 Information from ATC Unit:

1) Traffic information issued: ☐ Yes ☐ no

2) Information issued:
Direction Distance Heading




**Signature of reporting person** _____ **Date** _____

## UNIT 6

### *Emergency and urgency situations*

1. *Read the text. Think over what part of the text corresponds to the phrase: "Learn from the mistakes of others, you won't live enough to make them all yourself"* (Archie Grice, Instructor) *Ground your opinion.*

Emergencies

The sudden occurrence of an emergency situation will always place the pilot or the controller under some pressure at a time when quick thinking and rapid changes of plan may be required. It is important, that the pilot or the controller remains calm and in control of the situation. It is impossible to list every emergency that could occur but some consideration of likely incidents and their remedies will give the pilot or the controller a degree of confidence. No two situations are alike but anticipation and systematic approach will enable a pilot or a controller to cope with the unusual. Obviously he/she must act quickly but in the long run it may prevent the situation from deteriorating if initially the pilot or the controller spends a little time ensuring that he fully understands the nature of the emergency and how it affects the performance of the aircraft.

2. *Work in small groups. Spend five to seven minutes brainstorming all predictable emergencies experienced by civil aircraft.*

3. *When all the groups have finished, work as a class to share the ideas of each group. Try to organize all emergencies into four categories: 1)* The aircraft cannot maintain flight level; 2) The aircraft has handling difficulties; 3) Uncertainty situations, which may lead to a distress situation; 4) Unlawful interference.

*Reference for the teacher:*

Emergencies experienced by civil aircraft fall into four categories:

1) The aircraft cannot maintain flight level:
a) loss of power
b) must land immediately (fire, etc.)

2) The aircraft has handling difficulties:
a) control malfunction
b) structural damage

3) Uncertainty situations, which may lead to a distress situation:
a) bad weather
b) fuel shortage
c) lack of experience
d) lack of instrument ability and instrument failure

4) Unlawful interference:
a) hijacking
b) bomb scare

**4.** *Read the definitions and then answer the discussion questions:*

Distress and urgency conditions are defined as:

a) ***Distress***: a condition of being threatened by serious and/or imminent danger and of requiring immediate assistance.
b) ***Urgency***: a condition concerning the safety of an aircraft or other vehicle, or of some person on board or within sight, but which does not require immediate assistance.

The distress or urgency message to be sent by an aircraft in distress or urgency situation shall consist of the radiotelephony distress signal MAYDAY or the radiotelephony urgency signal PAN PAN spoken three times in a row and of as many as possible of the following elements spoken distinctly and, if possible, in the following order:

1) Name of station addressed;
2) The identification of the aircraft;
3) The nature of distress condition;
4) Intention of the person in command;
5) Present position, level and heading;
6) Any other useful information.

(*ICAO Annex 10*)

**MAYDAY** is an emergency code word, derived from French *venez m'aider*, and it means "come [to] help me". It is used to signal a life-threatening emergency not only in radio communications. Police forces, the fire brigades use it too.

**Pan Pan** (from the French: *panne* - a breakdown) indicates an urgent situation such as a mechanical breakdown or a medical problem.

For the purpose of announcing and identifying aircraft used for medical transports, a transmission of the radiotelephony urgency signal **PAN PAN** shall be followed by radiotelephony signal for medical transports MEDICAL, pronounced as the French "médical".
The aircraft in distress can use the frequencies reserved for emergency communications. The frequencies are 121.5 MHz for civilian and 243.0 MHz for military use.
The pilot encountering a state of emergency shall set the transponder to Mode A code 7700 except when previously directed by ATC to operate the transponder on a specified code. In the latter case the pilot shall maintain the specified code unless otherwise advised by ATC.

- *Discuss emergency and urgency situations as a class.*

**5.** *Read the story and fill the gaps with correct words from the brackets:*

**Passengers evacuated after emergency landing**

A Qantas jet carrying 178 passengers and 13 crew members made an _____ landing and was _____ at Japan's Osaka airport early Sunday after a signal

_____ there was smoke in its cargo hold. Nine people were injured as they left the Airbus A330 plane on _____. The plane was headed from Tokyo to Perth when it was _____ to Osaka. The airline said a Qantas plane would arrive by Monday to enable passengers to continue their journeys.

(*chutes, indicated, emergency, diverted, evacuated).*

- *Work as a class. Answer the teacher's questions.*

**6.** *Listen to the story and look at the pictures. Which one corresponds to this story?*

Photo 1

Photo 2

- *Work as a class. Answer the teacher's questions.*
- *Retell the story.*

7. **Read the article from the Associated Press. Think over what character traits and facts from the pilot's biography prove that he was ready to cope with an extraordinary situation.*

***Hudson River pilot was flying as a Texas teen***

By JEFF CARLTON

DALLAS — Mary Margaret Wilson had a gut feeling that her brother was at the controls when she heard about a US Airways plane making a safe landing in the Hudson River. "When I first saw it on TV, they were saying it was an amazing landing, like one in a million," Wilson, a Dallas resident and the sister of pilot Chesley B. Sullenberger III, said Friday. "And I thought to myself, 'That's something my brother could do.'"

Many who knew Sullenberger from his days growing up in the North Texas town of Denison had similar reactions to the news that he piloted a jetliner to a smooth landing on the river after the plane lost engine power, saving 155 lives.

Folks in the town of 23,000 people located about 65 miles north of Dallas recalled a kind and serious student whose parents were a respected dentist and schoolteacher. And they remember him making headlines in the local newspaper for piloting a crop duster when he was 15.

"He was a guy who stood out as a leader and really an outstanding student," Scott said.

Wilson said her brother's interest in flying grew out of discussions with their father, a Navy veteran who shared stories of his military service. He built model airplanes

At 15, he worked a part-time job and began splitting the cost of flying lessons with their dad, Wilson said. After he flew enough hours in the crop duster, he was able to fly solo and obtain a license.

Sometimes, he would take his younger sister for a ride.

"He was extremely professional," Wilson said. "He didn't cut any corners. I was never nervous flying with him. I don't really like going in small planes, but I would go with him anytime."

Sullenberger excelled after winning an appointment to the U.S. Air Force Academy, earning an airmanship award upon graduating, Wilson said. He flew F-4 fighter jets with the Air Force in the 1970s and then began working as a commercial pilot for Pacific Southwest Airlines in 1980. US Airways bought PSA in 1988.

Sullenberger has served on a board that investigated aircraft accidents and participated later in several National Transportation Safety Board investigations. He also runs a safety consulting firm and had been studying the psychology of keeping airline crews functioning even in the face of crisis.

"I think Burnett is a very duty-oriented person," Wilson said. "He is always looking to get better. He would be the one person who could land a plane in the water without any engines.

*Read the article once again, choose the lexis that you can use telling your life story. Tell your life story.*

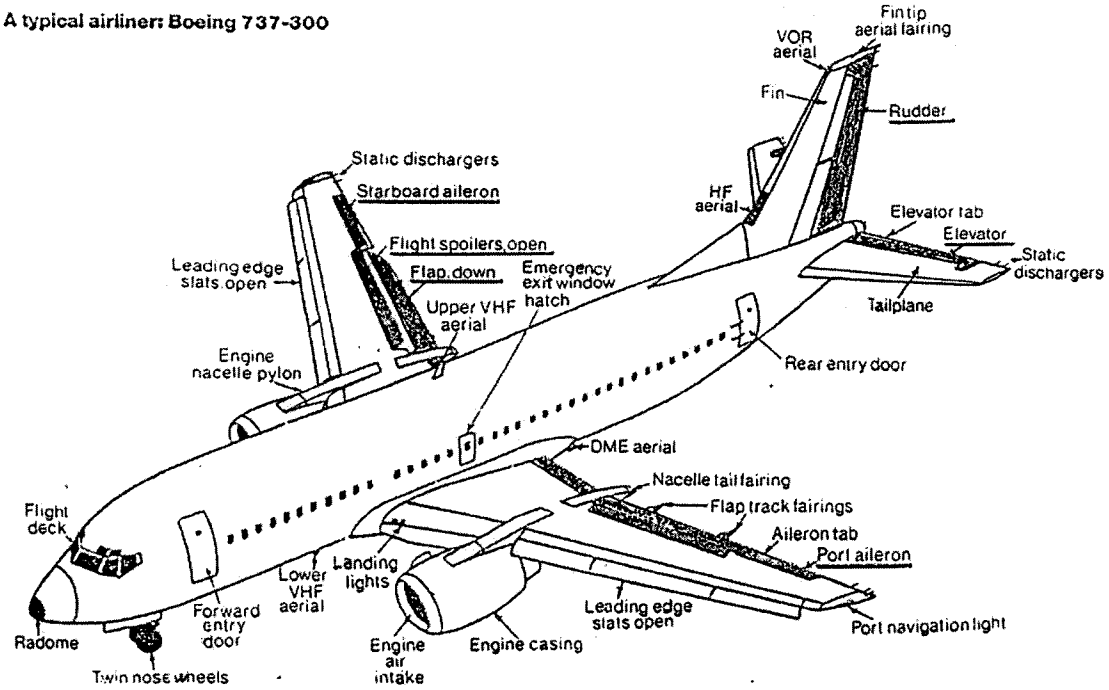
8. *Work as a class. Discuss how the pilots know that something is wrong.*

9. *Look at the diagram and name all Russian equivalents of airplane components:*

Radome -
Flight deck -
Twin nose wheels -
Forward/rear entry door -

Lower VHF aerial -
Landing lights -
Engine air intake -
Engine casing -
Leading edge, slats open -
Navigation light -
Port/starboard aileron -
Aileron tab -
Flap track fairings -
Nacelle tail fairing -
DME aerial -
Tail plane -
Static discharger -
Elevator -
Elevator tab -
Fin tip aerial fairing -
VOR aerial -
Fin -
HF aerial -
Emergency exit window hatch -
Upper VHF aerial -
Flaps down -
Flight spoilers open -
Engine nacelle pylon -

A typical airliner: Boeing 737-300




**10.** *Fill the gaps with appropriate terms:*

***Basic parts of an aircraft***

_____ is that part of the plane that contains the crew, passengers or cargo. All other major components are attached to the _____. Doors and windows are built into the _____. Empennage is another term used to refer to the aft portion of the fuselage plus the horizontal and vertical tails.
The _____ are the most important parts of an airplane since they produce the lift. They are usually attached to the top or bottom of the fuselage. They usually contain the fuel tanks.
The _____ are mounted in separate pods hanging below the wing or sometimes attached to the fuselage. These pods are called nacelles.
Control surfaces, which enable pilots to change the flight path of the aircraft, are hinged to the back of the wings, vertical stabilizer and horizontal stabilizer.
_____ _____ keeps an aircraft steady and stops it from pitching.
The _____ _____ functions in the same way as the horizontal stabilizer, except that it provides stability for disturbance in yaw.
The _____ are attached to the back of the wings, the _____ to the back of the vertical stabilizer and the _____ to the horizontal stabilizer.
_____ are usually located along the trailing edge of both the left and right wing.
The _____ _____ are used during takeoff, landing, and to taxi on the ground.

**11.** *Fill in the gaps with appropriate terms: rudder, flaps, ailerons, elevator.*

An aircraft maintains control in flight with its control surfaces. These are:

- the _____ that control roll;
- the _____ that controls yaw;
- the _____ that controls pitch;
- the _____ which provide extra lift and drag.

**12.** *Listen to the story; name the aircraft elements that sustained damage and name the cause of the damage:*

**13.** Read the story.

*The plane is DC-9,* a two-pilot aircraft. *Midway through the flight the* copilot *leaves the* cockpit *to use the lavatory. A long time passes, and the captain grows concerned. He calls the* flight attendants *on the intercom, and asks them to check on the copilot.*
But both attendants are *at the rear of the cabin*, and *the beverage cart* is blocking the aisle, making it impossible for them to go to the forward lavatory.
Since it is the middle of the flight, the captain decides to check on the copilot himself. He *activates* the automatic pilot, *steps out of* cockpit and closes the door behind him.
Just then, the copilot emerges from the lavatory. Both of them realized with dismay that neither has the key to the cockpit door. The two pilots have to smash the door with a fire axe in front of horrified passengers.

*a) Give synonyms or paraphrase the italicized words.*

*b) Work as a class. Answer the teacher's questions.*

c) *Tell the story as if you were a passenger on that flight. Describe your feelings when you have seen the pilots smashing the cockpit door with a fire axe.*

**14.** *(P) Read the description of the Boeing 747 and compare these characteristics with those of the aircraft type you fly.*

The Boeing 747 is a large, wide-body (two-aisle) airliner with four wing-mounted engines. Seating capacity is more than 366 with a 3-4-3 seat arrangement (a cross section of 3 seats, an aisle, 4 seats, another aisle, and 3 seats) in economy class and a 2-3-2 arrangement in first class on the main deck. The upper deck has a 3-3 seat arrangement in economy class and a 2-2 arrangement in first class.

***Fire on board***

**15.** *Listen to the recordings and fill in the table. Then describe the nature of each problem using the table.*

| | What and where | Pilot's request |
|---|---|---|
| GLVCD | | |
| AAL 143 | | |
| DLH 3213 | | |
| BAW 872 | | |
| TCH 321 | | |

**16.** *Read the story and replace italicized words with the synonyms.*

# *Jet's landing gear catches fire in Miami*

MIAMI (AP) — A jet's landing gear caught fire on the runway at Miami International Airport after two tires blew out during landing, officials said. No one was injured, and the fire was quickly *extinguished*.

U.S. Airways Flight 431 was arriving from Charlotte, with 113 passengers and five crewmembers when it blew two tires on the runway shortly before noon, airline spokesman Morgan Durrant said.

A small fire ignited in one of the blown-out tires, Durrant said. The passengers and crew *escaped* using *inflatable* slides from the plane's exits, then waited in a grassy area near the runway. Helicopter footage showed the flames extinguished and the plane surrounded by white foam.

Passenger Jenna Kettenburg, 25, of Trenton, N.J., said that the landing was normal at first but suddenly became rough. "It was real jagged and shaky," she said. The plane's oxygen masks *came down* and passengers were told to evacuate on the *slides*.

Patrice White, 23, of Baltimore, said, "We didn't think it was that big of a deal," until she got off and saw the fire. According to Federal Aviation Administration records, the Boeing 737 jet was built in 1989.

- *Work as a class. Answer the teacher's questions.*

**17.** *Listen to the story; try to catch the meaning of unfamiliar words from the context.*

- *Organize the sentences in chronological order:*

1. At about the same time a strange odor was smelled at the aft of the plane.
2. The emergency landing was carried out on RWY 27L at 19.20 h.
3. After finding out that the lavatory was full of smoke, a cabin attendant used the $CO_2$ bottle to put out the fire.
4. During the descent smoke began to fill the cabin.
5. Flight 797 took off from Dallas for a flight to Montreal via Toronto.
6. The aircraft started developing electrical problems and a MAYDAY call was issued.
7. Flight 797 started descent and contacted Cincinnati at 19.10 h for an emergency.
8. While cruising at FL 330 the three aft lavatory flush motor circuit breakers tripped.

- *Work as a class. Discuss firefighting equipment available aboard an aircraft.*

**18.** *Listen to the story. Are these sentences true (+) or false (-):*

1. VanJet Flight 512 took off from Miami RWY 09L at 14.04 for a flight to Atlanta.
2. While flying at flight level 340 at 232kts IAS the altitude dropped by 815ft and the indicated airspeed decreased 34kts in 3secs time.
3. The crew requested to return to Atlanta due to smoke in the cockpit.
4. Flight 592 was vectored for a RWY 12 approach.
5. Fifty seconds later the aircraft struck a swamp with the nose pitched down and disintegrated.
6. There was a very intense fire in the middle of the forward cargo hold, possibly caused by oxygen generators carried in the cargo hold.

- *Name the cause of the crash.*
- *What type of flight was it? (A passenger or a cargo flight?) Please ground your opinion.*

**19.** *Listen to the story.*

a) *Are these sentences true (+) or false (-):*

1. En route from Memphis to Boston, flying at FL 330, the warnings indicated smoke on cargo areas 7, 8 and 9 on the upper deck.
2. An emergency landing was carried out 20mins later at Newburgh RWY 07.
3. The aircraft was taxied onto a taxiway and evacuated immediately.

4. The captain had some trouble opening the side window, because visibility suddenly went to near zero as the cockpit filled with smoke.
5. The jump seat crew exited via the right emergency slide.
6. Firefighters were not able to reach the source of the smoke due to the cargo arrangement.
7. 40mins later the fuselage structure was weakened by the fire, causing the tail section to separate.
8. About 4hrs after landing, the fire was extinguished.

*a) Work as a class. Answer the questions.*

*b) Please describe the area of responsibility of the flight crew/cabin crew.*

***Engine failure***

***20.***

*a) Read the story; pay attention to italicized words; if their meaning is unclear to you ask your teacher to clarify it.*

The MD-81 arrived from Zurich at 22.09h and was parked at gate 2 overnight with temperatures of around +1°C. Approximately 2550kg of fuel remained in each wing tank. The aircraft was scheduled to leave Stockholm for Copenhagen at 08.30h and the temperature had dropped to -0 deg C in the early morning. During the night and in the early morning *clear ice had formed* on the upper side of the wings, but this was not *detected* by the ground crew member who checked the forward part of the wing. The aircraft was fuelled with 1400kg of fuel and was ready for *de-icing* at 08.30h, which was done using 850l of Type I fluid. After de-icing the mechanic didn't check whether there was any clear ice on the upper side of the wings, since he had previously found none. The flight was then cleared to taxi to runway 08 and the aircraft took off at 08.47h. After 25 seconds *bangs, vibrations and jerks* were perceived in the aircraft. This was caused by a no.2 *engine surge*. The no.1 engine surged 39 seconds later, but this was not noticed by the flight crew. An attempt to *switch on the autopilot* at 2616ft failed. At 76 resp. 78 seconds into the flight both the no.2 and no.1 engine *failed.* The aircraft was climbing through 3206ft at that moment with a 196 KIAS. A no.1 engine fire warning at 91 seconds into the flight made the crew *activate the fire extinguishing system.* A SAS captain traveling in the passenger cabin realized that there were problems and hurried to the cockpit to assist the flight crew. The aircraft was in a gliding left turn at that moment. When descending through 420m, still in the clouds, the assisting captain gradually *extended the flaps*. The flaps were fully extended at 1100ft (340m) and the plane *broke through the clouds* at 980-820ft. A field in the direction of flight was chosen for an emergency landing. *The wheels were selected down* and Stockholm control was informed about the imminent crash-landing. The MD-81 contacted trees at 121kts and a major portion of *the right wing broke off*. The plane then struck sloping ground tail-first and slid along the ground for 110m. The fuselage was broken into three pieces, but there was no fire.

*b) Determine the cause-effect relationship, discuss it with a partner:*
*Clear ice; engine surge; autopilot failure; bangs, vibration and jerks; engine fire.*

*c) Agree or disagree with the statement: "Icing is dangerous for flight operations". Justify your opinion.*

*d) Discuss with a partner the following questions:*

1) What else can cause engine failure?
2) What engine failures other than surge do you know?
3) In what cases would the pilot shut down the engine as a precaution?
4) Is precautionary engine shut-down possible on a single-engine aircraft?
5) Is it possible to restart an engine in the air?
6) After an unsuccessful engine start-up on ground it is necessary to let excessive fuel out of the engine. What is to be done for it?

*e) When all the groups have finished, share your ideas as a class.*

***21.** Match pairs:*

*a)*

| | |
|---|---|
| a) emergency | 1) slide |
| b) oxygen | 2) interior |
| c) back course | 3) hold |
| d) fuel | 4) indication |
| e) exhaust | 5) approach |
| f) precautionary | 6) bottle |
| g) wrong | 7) dump |
| h) cargo | 8) mask |
| i) fire | 9) shut down |
| j) aircraft | 10) gases |

*b)*

| | |
|---|---|
| a) dump | 1) fire bottle |
| b) shut down | 2) fuel |
| c) put out | 3) engine |
| d) discharge | 4) fire |

***22.** Listen to the text and fill the gaps:*

The Boeing 707 took off from Luxemburg at 07.14h for an IFR flight to Kano, carrying 38 tons of freight. The aircraft, on a heading of 199, when passing VILAR and VOR of Martigues, was authorized to leave FL290 for FL330. The flight section was performed in _____ in turbulent air. With the throttles at climb power and _____ _____ the aircraft was flying at 280 IAS passing FL320. At this moment, the crew was experiencing severe turbulence and heard a double "bang". The aircraft suddenly rolled to the right. The captain _____ _____ and struggled to keep control by countering with the control stick and _____ pedals. The continuous _____ warning system sounded, but could not be _____ _____ by the flight engineer. The first officer noted that the no.4 engine had _____ and sent out a MAYDAY call (at 08.11h). The crew started the descent towards Marseilles and initiated the _____ _____ procedure. During the descent the first officer noted an airfield ahead (which was Istres) and Marseilles transferred the aircraft to Istres Control. A left hand _____ was flown for a RWY 15 landing at Istres. The plane touched down slightly to the left of the centerline at 190 speed. Emergency brakes had to be used to decelerate. The left _____ _____ tyres burst during the landing roll and the flight engineer selected maximum reverse thrust on the no.2 engine. After a 2300m ground roll, the 707 went off the left side of the runway and stopped 250m further on. The fire

on the right wing (which had erupted in the final approach phase) was _____ _____.
The landing took place at 08.35, about 24min after engine separation.

- *Answer the teacher's questions.*

***23.*** *Work with a partner. Discuss the actions of the crew in the non-routine situation.*

***24.*** *Make short pilot-controller dialogues:*

1) Пилот объявляет бедствие и сообщает, что будет садиться на ближайшем аэродроме.
2) Пилот сообщает, что у них проблема с закрылками (не убираются). Попросит минут 10 в зоне ожидания, чтобы устранить проблему. Через несколько минут сообщает, что они решили (устранили) проблему с закрылками.
3) Пилот запрашивает аварийную посадку и просит предупредить аварийные службы.
4) Экипаж выполняет аварийное снижение, у них индикация пожара в багажном отделении.
5) Пожар на борту, сильное задымление пассажирского салона. Пилот запрашивает аварийное векторение на ближайший аэродром. Диспетчер объявляет режим радиомолчания.
6) Пилот сообщает, что предпочтет правый/левый разворот, так как у вас отказал правый/левый двигатель.
7) Пилот сообщает, что у них высокая температура выхлопных газов, поэтому они отключили двигатель № 2 в качестве превентивной меры.
8) На борту дым в заднем туалете. Экипаж сообщает, что будет садиться с обратным курсом.
9) Пилот сообщает, что будет садиться на ближайшем аэродроме, но вес выше посадочного на 5 тонн и они хотят слить топливо. Просит векторение в зону слива топлива.

## UNIT 7

### *Instrument panel*

1.
Cockpit as a term for the pilot's compartment in an aircraft first appeared in 1914.
A cockpit is the area, usually near the front of an aircraft, from which a pilot controls the aircraft.
The cockpit of an aircraft contains flight instruments, called an instrument panel, and the controls which enable the pilot to fly the aircraft. In most large airliners, a door separates the cockpit from the passenger compartment.

Flight instruments

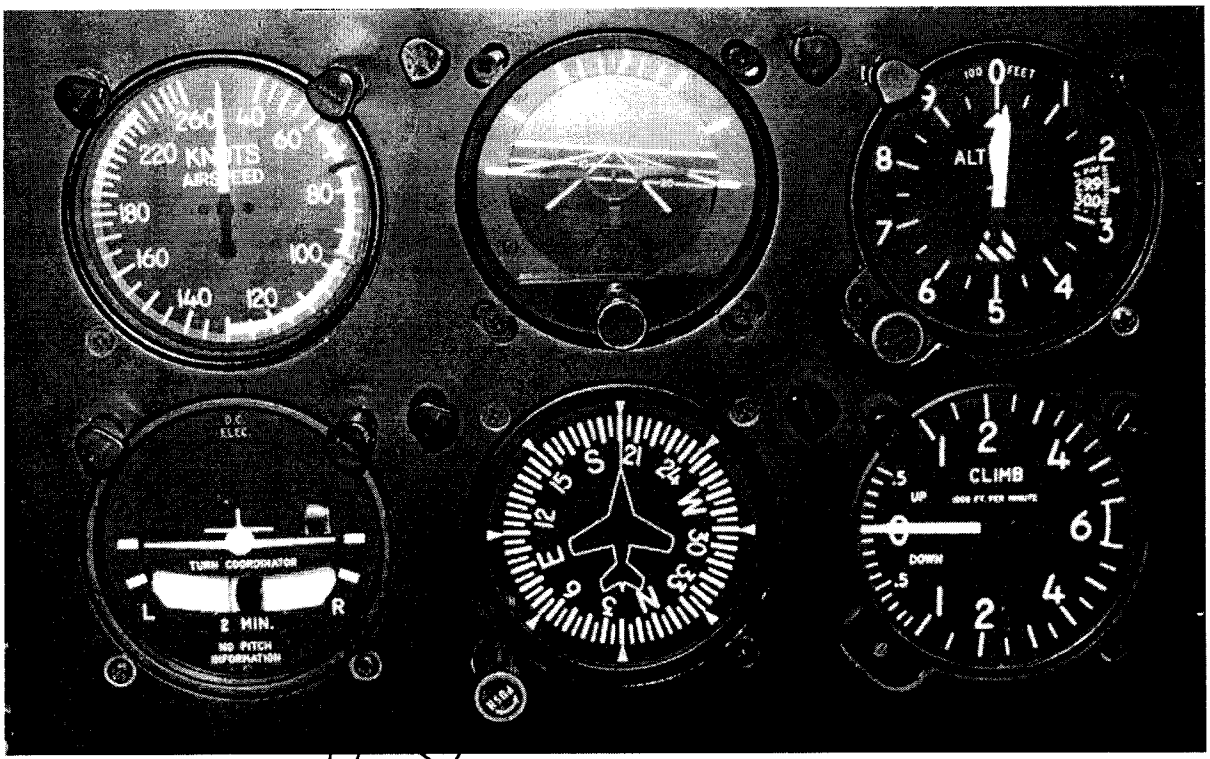



Photo by Meggar.

***2.*** *Look at the photo and name the flight instruments:*

- top row:
- bottom row:

(Vertical speed indicator, artificial horizon, airspeed indicator, radio compass, direction indicator, altimeter)

***3.*** *Most aircraft are equipped with a standard set of* ***flight instruments*** *which give the pilot information about the aircraft attitude, airspeed and altitude etc.*
*Most aircraft have these six basic flight instruments.*
*Put in appropriate terms:*

_____ gives the aircraft's height (usually in feet or meters) above some reference level (usually sea level) by measuring the local air pressure. It is

adjustable for local barometric pressure (referenced to sea level) which must be set correctly to obtain accurate altitude readings.

_____ shows the aircraft's attitude relative to the horizon. From this the pilot can tell whether the wings are level and if the aircraft nose is pointing above or below the horizon. This is a primary instrument for an IFR flight and is also useful in conditions of poor visibility.

_____ shows the aircraft's speed (usually in knots) relative to the surrounding air. The indicated airspeed must be corrected for air density (which varies with altitude, temperature and humidity) in order to obtain the true airspeed, and for wind conditions in order to obtain the speed over the ground.

_____ shows the aircraft's heading relative to magnetic north. While reliable in steady level flight it can give confusing indications when turning, climbing, descending, or accelerating due to the inclination of the earth's magnetic field.

_____ displays the aircraft's heading with respect to geographical north. In many advanced aircraft (including almost all jet aircraft), the _____ is replaced by a Horizontal Situation Indicator (HSI) which provides the same heading information, but also assists with navigation.

_____ is also sometimes called a variometer. It senses changing air pressure, and displays that information to the pilot as a rate of climb or descent in feet per minute, meters per second or knots.

(Artificial Horizon, Altimeter, Airspeed Indicator, Magnetic Compass, Vertical Speed Indicator, Heading Indicator)

***3.*** *Work in pairs. Make short pilot-controller dialogues:*

1) C Попросите подтвердить эшелон 130.
P Подтвердите эшелон 130.
C Сообщите пилоту, что их ответчик показывает эшелон 137.
P Скажите, что у вас неполадки с высотомером, попросите разрешение несколько минут сохранять прежний эшелон, чтобы устранить неполадки с высотомером.

2) P Сообщите диспетчеру, что у вас что-то с указателем курса, попросите его говорить вам когда начинать отворот и когда остановиться.
C Примените для этого стандартную фразеологию.

3) P Сообщите диспетчеру, что у вас отказал указатель воздушной скорости, попросите его давать вам вашу скорость каждые 10-15 секунд.
C Информируйте пилота о воздушной скорости.

4) P Сообщите диспетчеру об отказе авиагоризонта, запросите продолжение полета в визуальных условиях.
C Предложите экипажу изменение маршрута, чтобы они оставались в визуальных условиях.

### *Electronic instruments*

***5.*** *Read the text. (P) Think over which of the listed instruments are available aboard the aircraft you fly.*

An aircraft cockpit that features electronic instrument displays is called *a glass cockpit.* Where a traditional cockpit relies on numerous mechanical gauges to display information, a glass cockpit utilizes several computer displays that can be adjusted 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.
In the modern electronic cockpit, the following flight instruments are usually regarded as essential: MCP, PFD, ND, EICAS, FMS/CDU and Back-up Instruments.

**MCP/FCU**

A Mode Control Panel, usually a long narrow panel located centrally in front of the pilot, may be used to control Heading (HDG), Speed (SPD), Altitude (ALT), Vertical Speed (V/S), Vertical Navigation (VNAV) and Lateral Navigation (LNAV). It may also be used to engage or disengage the Autopilot System. Depending on the manufacturer this panel might have a different designation. MCP is a Boeing designation, the same unit on an Airbus aircraft is referred to as the FCU (Flight Control unit).

**PFD**

The Primary Flight Display will usually be located in a prominent position, either centrally or on either side of the cockpit. It will show the current pressure setting for the altimeter (local or standard), filed speed and current speed, filed altitude and current altitude, vertical speed and the condition of the Instrument Landing System (ILS) (if engaged).

**ND**

A Navigation Display, which may be adjacent to the PFD, shows the current route and information on the next waypoint, current wind speed and wind direction.

**EICAS/ECAM**

The Engine Indication and Crew Alerting System (for Boeing) or Electronic Centralized Aircraft Monitor (for Airbus) will allow the pilot to monitor the following information: values for N1, N2 and N3, fuel temperature, fuel flow, the electrical system, cockpit or cabin temperature and pressure, control surfaces and so on. The pilot may select display of information by means of button press.

**FMS**

The Flight Management System/Control Unit may be used by the pilot to enter and check for the following information: Flight Plan, Speed Control, Navigation Control, and so on.

**Back-up instruments**

In a less prominent part of the cockpit, in case of failure of the other instruments, there will be a set of back-up instruments, showing basic flight information such as Speed, Altitude, Heading, and aircraft attitude.

*(P) Does your aircraft type have a glass cockpit or a traditional cockpit?*

***6.*** *(P) Work in pairs. Discuss instruments that you have in your cabin.*

*7. Look at the photo. This is an Airbus A380 cockpit. Discuss with your neighbor the instrument panel. What instruments and displays are familiar to you? What are their functions?*

Photo by Nadssy

*8. Read the text and answer the teacher's questions:*

***Flight Management System***

A flight management system is a fundamental part of a modern aircraft in that it controls the navigation. The flight management system (FMS) is the avionics that holds the flight plan, and allows the pilot to modify it as required in flight. The FMS uses various sensors to determine the aircraft's position. Given the position and the flight plan, the FMS guides the aircraft along the flight plan. The FMS is normally controlled through a small screen and a keyboard.

All FMS contain a navigation database. The navigation database contains the elements from which the flight plan is constructed. The navigation database is normally updated every 28 days, in order to ensure that its contents are current. The navigation database contains all of the information required for building a flight plan and information relevant to it. These include

- Waypoints;
- Airways;
- Radio navigation aids including DME (Distance Measuring Equipment), VOR (VHF Omni-directional Range) and NDB (Non-directional Beacons);
- Airports;

- Runways;
- SID;
- STAR;
- Holding patterns;
- And a variety of related information.

The flight plan is generally determined on the ground, before departure either by the pilot for smaller aircraft or a professional dispatcher for airliners. It is entered into the FMS either by typing it in, selecting it from a saved library of common routes (or Company Routes) or via a data link with the airline dispatch center.

During preflight other information relevant to managing the flight plan is entered. This can include performance information such as gross weight, fuel weight and center of gravity. It will include altitudes including the initial cruise altitude. For aircraft that do not have a GPS, the initial position is also required.

The pilot uses the FMS to modify the flight plan, in flight for a variety of reasons. Significant engineering design minimizes the keystrokes in order to minimize pilot workload in flight and eliminate any confusing information. The FMS also sends the flight plan information for display on the Navigation Display (ND) of the flight deck instruments (EFIS). The flight plan generally appears as a magenta line, with other airports, radio aids and waypoints displayed.

## Position Determination

Once in flight, a principal task of the FMS is to determine the aircraft's position and the accuracy of that position. Simple FMS use a single sensor, generally GPS in order to determine position. But modern FMS use as many sensors as they can in order to determine and validate exactly their position.

- Airline quality GPS receivers act as the primary sensor as they have the highest accuracy and integrity.
- Radio aids designed for aircraft navigation act as the second highest quality sensors. These include;
    - Scanning DME (Distance measuring equipment) that checks the distances from five different DME stations simultaneously in order to determine one position every 10 seconds or so.
    - VOR's (VHF Omni-directional Radio Range) that supply both distance and bearing. With two VOR stations the aircraft position can be determined, but the accuracy is limited.

The FMS constantly crosschecks the various sensors and determines a single aircraft position and accuracy. Given the flight plan and the aircraft's position, the FMS calculates the course to follow. The pilot can follow this course manually (much like following a VOR radial), or the autopilot can be set to follow the course.

97 *Agree or disagree with the following statement:* "If you want to upset an airline pilot, tell him that his FMS is inoperative. He can fly without it but he doesn't want to." (CRJ captain). *Justify your opinion.*

***10.*** *Make short controller-pilot dialogues:*

1) P Запросите ветер в точке на вашем эшелоне.
C Уточните, в каком месте экипажу нужен ветер в точке и зачем.
P Ответьте, что вам нужны данные в любой точке на вашем эшелоне для проверки вашего бортового компьютера.

2) P Сообщите диспетчеру, что у вас отказал автономный контроль целостности в приемнике (RAIM), запросите место и вектoрение.
C Дайте место и курс.

3) P Сообщите, что у вас полный отказ приборов, запросите немедленную посадку на ближайшем аэродроме.
C Назовите ближайший аэродром, рабочую полосу, ее длину, ветер и давление.

4) P В аэропорту вылета нет частоты выдачи разрешения УВД. Попросите у диспетчера руления указания по выходу из зоны аэродрома, в частности схему выхода для того, чтобы ввести ее в бортовой компьютер.
C Скажите пилоту, что схему выхода ему позже даст диспетчер старта.

***11***. *Read the text, after you've read it you will answer the teacher's questions.*

## *Autopilots*

In the early days of aviation, aircraft required the continuous attention of a pilot in order to fly safely. As aircraft range increased allowing flights of many hours, the constant attention led to serious fatigue. An autopilot is designed to perform some of the tasks of the pilot.

The first aircraft autopilot was developed by Sperry Corporation in 1912. Lawrence Sperry (the son of famous inventor Elmer Sperry) demonstrated it two years later in 1914, and proved the credibility of the invention by flying the aircraft with his hands away from the controls and visible to onlookers.

Not all passenger aircraft flying today have an autopilot system. Older and smaller general aviation aircraft especially are still hand-flown, while small airliner with less than twenty seats may also be without an autopilot as they are used on short-duration flights with two pilots. The fitment of autopilots to airliners with more than twenty seats is generally made mandatory by international aviation regulations.

Autopilots in modern complex aircraft generally divide a flight into taxi, take-off, ascent, level, descent, approach and landing phases. Autopilots exist that automate all of these flight phases except the taxiing. An autopilot-controlled landing on a runway and controlling the aircraft on rollout (i.e. keeping it on the centre of the runway) is known as a CAT IIIb landing or Autoland, available on many major airports' runways today, especially at airports subject to adverse weather phenomena such as fog. Landing, rollout and taxi control to the aircraft parking position is known as CAT IIIc. An autopilot is often an integral component of a FMS.

Modern autopilots use computer software to control the aircraft. The software reads the aircraft's current position, and controls a Flight Control System to guide the aircraft. Although autopilots handle new or dangerous situations inflexibly, they generally fly an aircraft with a lower fuel-consumption than a human pilot.

Aviation Autopilot Categories of Landing

Instrument-aided landings are defined in categories by the ICAO. These are dependent upon the required visibility level and the degree to which the landing can be conducted automatically without input by the pilot.

**CAT I** - This category permits pilots to land with a decision height of 200 ft (61 m) and a forward visibility or Runway Visual Range (RVR) of 2400 ft (730 m). Simplex autopilots are sufficient.

**CAT II** - This category permits pilots to land with a decision height between 200 ft and 100 ft (≈ 30 m) and a RVR of 1000 ft (305 m). Autopilots have a fail passive requirement.

**CAT IIIa** -This category permits pilots to land with a decision height as low as 50 ft (15 m) and a RVR of 700 ft (213 m). It needs a fail-passive autopilot.

**CAT IIIb** - As IIIa but with the addition of automatic roll out after touchdown incorporated with the pilot taking control some distance along the runway. This category permits pilots to land with a decision height less than 50 feet or no decision height and a forward visibility of 250 ft (76 m, compare this to aircraft size, some of which are now over 70 m long) or 300 ft (91 m) in the United States. For a landing-without-decision aid, a fail-operational autopilot is needed. For this category some form of runway guidance system is needed: at least fail-passive but it needs to be fail-operational for landing without decision height or for RVR below 375 feet (114 m).

**CAT IIIc** - As IIIb but without decision height or visibility minimums, also known as "zero-zero".

Today, autopilots are sophisticated systems that perform the same duties as a highly trained pilot. In fact, for some in-flight routines and procedures, autopilots are even better than a pair of human hands. They don't just make flights smoother; they make them safer and more efficient.

***12.*** *Work in groups. Discuss the causes that can make the autopilot to disengage during the flight. Then share your ideas as a class.*

***13.*** *Simulate a pilot-controller dialogue in the following situation: The aircraft is flying on autopilot. Suddenly the plane encounters a down draft. It dives steeply, the autopilot disconnects. The controller instructs the pilot to climb immediately to assigned level, then he asks the crew to explain an unauthorized descent.*

***14.*** *Read the text and answer the teacher's questions:*

***Aircraft electrical system***

The function of the aircraft electrical system is to generate, regulate and distribute electrical power throughout the aircraft. New-generation aircraft rely heavily on electrical power because of the wide use of electronic flight instrument systems.

Aircraft electrical power is used to operate: aircraft flight instruments; essential systems such as anti-icing; passenger services.

Essential power is power that the aircraft needs to be able to continue safe operation.

Passenger services power is the power that used for: cabin lighting; operation of entertainment systems and preparation of food.

There are several different power sources on large aircraft to be able to handle excessive loads, for *redundancy*, and for emergency situations.

These power sources include:

- **Engine driven AC generators**: Each of the engines on an aircraft drives an AC generator. The power produced by these generators is used in normal flight to supply the entire aircraft with power.
- **Auxiliary Power Units:** Most often the APUs power is used while the aircraft is on the ground during maintenance or for engine starting. However, most aircraft can use the APU while in flight as a backup power source.
- **External power** may only be used with the aircraft on the ground. This system utilizes a Ground Power Unit (GPU) to provide AC power through an external plug on the nose of the aircraft. GPUs may be either portable or stationary units.
- **The aircraft's nickel cadmium battery** is final source of backup power. When using the battery, power usage is limited by the short life of the battery.

***15.*** *Listen to the story. You will listen twice. First listen for the gist. Fill the table while listening the second time.*

Dec 3rd 2008
An Emirates Airbus A380-800, registration A6-EDA performing flight EK201 from Dubai (United Arab Emirates) to New York JFK, NY (USA), had departed Dubai with 14 hours of delay and was about 3 hours into the flight, when an electrical fault prompted the crew to return to Dubai, where the airplane landed safely just before 6am the following day (about 21 hours after scheduled departure).
Emirates reported that the delay before departure had been caused by a faulty fuel pump. While en route an electrical problem developed, that also left passengers without reading lights and in-flight entertainment system, prompting the crew to return to Dubai. The passengers were rebooked onto today's flights to New York and other destinations in the United States.

| | |
|---|---|
| Date | |
| Registration | |
| Flight number | |
| Aircraft type | |
| Flight stage | |
| Type of flight | |
| Departure aerodrome | |
| Destination | |
| Cause of delay | |
| Cause of return | |
| Nature and effect of failure | |

*Retell the story using the table.*

***16.*** *Listen to the story. Pay your attention to the description of the problem.*

- *Answer the teacher's questions.*

***17.*** *Work in groups. Simulate the situation described in the previous story: The aircraft has just lined up and is waiting for takeoff clearance. The captain and first officer are completing the checklist. Flight attendants have taken their jump seats. Suddenly passengers from seat rows 1 and 2 see sparks and arcing, and then they smell smoke of burning wires. They call a flight attendant. The flight attendant informs the flight crew*

*about the problem. After clarifying the situation the crew request Tower to return to the ramp. You have five minutes to prepare for role play.*

***18.*** *Simulate pilot-controller communications in the following situations:*

1) Пилот сообщает о проблеме с системой электропитания, просит посадку на запасном аэродроме.
2) Экипаж сообщает, что у них сели батареи, просит АПА.
3) Экипаж сообщает, что на борту вышли из строя АЗС механизма слива в задних туалетах, туалеты постепенно заполняются дымом. Запрашивает немедленную посадку на ближайшем аэродроме.
4) Экипаж сообщает, что из-за неполадок в системе электропитания на борту не работает система кондиционирования пассажирского салона. Запрашивает возврат на аэродром вылета.

### *Hydraulic system*

Hydraulic system is used for flight control, actuation of flaps, slats, landing gear, brakes. It provides the extra force required to move large control surfaces in heavy aerodynamic loads.

***19.*** *Look through the list of some devices operated by hydraulic systems in aircraft. Please cross out the ones that do not exist aboard a civil aircraft:*

Retraction and extension of landing gear
Opening and closing doors and hatchways
Automatic pilot
Gun turrets
Speed and flap brakes
Bomb bay doors and bomb displacement gears
Pitch changing mechanism, spoilers on flaps

***20.*** *Read the question of the passenger and the answer of Captain Meryl Getline.*

**Question:** What is the worst that can happen to a plane with hydraulic problems? What are common problems?
Anthony Hazzard, Marlboro, New York

**Answer:** The worst thing that can happen is, if all hydraulics is lost, the pilots may have little to no control of the plane. They may be forced to try and control the plane through the use of asymmetric thrust as was the case when United's flight 232 lost all its hydraulics on a DC-10 on July 19th, 1989, due to a freak series of events (the plane was modified after that to prevent a repeat). Asymmetric thrust simply means applying more power on one side than the other to steer the plane.
Under normal circumstances, the loss of one hydraulic system is not catastrophic as there are multiple systems independent of each other, any one of which can control the plane, not to mention systems themselves are redundant.
For instance, if hydraulics can't extend the landing gear, there is another method to get the gear down by letting it freefall and cranking it into place or using other, similar methods.

Some hydraulic systems are engine-driven, while others are electrically driven. Some are color-coded (green, blue, yellow), some are numbered and some are labeled A, B, etc. to distinguish the various systems. Each aircraft manufacturer establishes its own method of labeling various systems.
Some planes even have a small propeller that may be extended beneath the plane to power the hydraulics (and part of the electrical system if needed) in the event of a dire emergency. This propeller is called a "RAT," pronounced just the way you see it. It stands for "Ram Air Turbine." Aircraft I've flown which have a RAT include the Airbus 319/320 as well as the B-777.
Hydraulics provide power from fluid under pressure. Controls such as the rudder, slats, flaps, landing gear, etc.) may all be hydraulically powered, and more than one hydraulic system may control a single control or control surface.

- *Discuss with a partner what systems depend on hydraulics?*

***21**. Look through the list of possible problems caused by hydraulic system failure or malfunctions. What actions can the crew take in these situations?*
Example:
*Flaps are jammed on zero.* – The crew will refer to the checklist first and will try to sort out the problem. If they are unable to fix the problem, they will inform the controller that the crew will perform a flapless landing and that the landing speed will be higher than normal. The pilots will request the longer runway or the runway equipped with arresting system.

1) Hydraulic level is low.
2) There are only two greens.
3) The landing gear won't come up.
4) The crew can't extend landing gears.
5) Rudder pedals are stuck.
6) Elevator is jammed.

***22**. *Read the continuation of the answer of Captain Meryl Getline and retell the story:*

For instance, I once lost my Blue hydraulic system on an Airbus 320 while flying from Las Vegas to Washington, D.C.'s Dulles Airport. Frankly, if I hadn't seen the loss on my gauges I probably wouldn't have noticed some of my control surfaces were moving at half their normal speed. They just seemed a little sluggish.
Other hydraulic losses may result in more severe problems. Once, pulling into the gate at Madison, Wisconsin in a B-727, we lost our primary (A) hydraulic fluid, which spilled all over the ramp. A mechanic had to be flown in to repair the problem. This particular hydraulic problem sticks in my mind because the entire crew—three pilots and four flight attendants, were driven in a van to Green Bay, about 140 miles away, to crew another plane.
Somewhere along the way we had a flat tire, and wound up standing around in a field in our uniforms. An old farmer rumbled up to us in a beat-up red tractor and asked us what our uniforms were for. When we told him, he scratched his head and said, "Funny, I didn't know United Airlines flew into Beaver Dam (I think that was the location name)."
It just struck us funny, and I remember standing around under the hot sun in our by-then not-so-spiffy uniforms laughing at the ridiculousness of this airline crew, standing in a field in Wisconsin with a flat tire on our van, going no place any time soon.

***23**. (P) Have you ever experienced similar problems caused by hydraulics failure?*

*Share your experience with your colleagues.*

***24.*** *Fill the gaps with appropriate words from the brackets:*

1) 25 seconds before impact GPWS _____.
2) Another flight returned to Portland International Airport after oxygen masks _____ 15 minutes into a flight to Denver.
3) A plane _____ cabin pressure and was forced to make an emergency landing at Cincinnati-Northern Kentucky International Airport.
4) Singapore Airlines flight 153 from Jakarta _____ a tire when it landed at Changi Airport.
5) The runway was closed for 15 minutes to _____ the debris from the burst tire.
6) A British Airways jet made an emergency landing at Gatwick after the pilot _____ burning in the cockpit yesterday.
7) A huge military cargo plane _____ problems after takeoff and _____ attempting to return to Dover Air Force Base.
8) While flying at FL 330 at 232 knots airspeed the altitude _____ by 815 feet and the indicated airspeed _____ by 34 knots in three seconds time.
9) All mobile phones are required to be _____ during the flight for safety reason.
10) A Thomas Cook flight from Mahon in the Balearic Islands to Birmingham diverted to Gatwick when the pilot _____ a vibration in one of the engines.

*(lost, switched off, decreased, burst, detected, crashed, deployed, popped out, developed, smelt, dropped)*

***25.*** *Listen to the story and answer the questions:*

1) What was the problem?
2) What did the pilots request for checking whether the landing gear was down?
3) Why did two inbound flights have to divert to the alternate airdrome?

***26.*** *Read the news item published on the news lines. Ask your teacher to clarify the situation. Ask questions:*

1) About the cause of returning to the departure aerodrome;
2) About fuel dump;
3) Whether thrust reversers were used;
4) About the cause of the failure.

An Air Canada Jazz Canadair CRJ-705, registration C-FKJZ performing flight QK-8318 from Vancouver, (Canada) to San Diego, (USA) with 81 people on board, returned to Vancouver.

***27.*** *Listen to the story and answer the questions.*

1) What was the main cause of all technical problems that the aircraft experienced?
2) What was the man who offered his assistance?
3) Why did the plane line up the shorter runway instead of the longer one?

4) Answering the passenger's question about hydraulics failure Captain Meryl Getline mentioned asymmetric thrust. Please explain what she meant. How did the crew manage to cope with a continuous tendency to turn to the right?

***28***. **Read the transcript of radio communications.*
*Pay attention to phrases where the pilots informed the controller about their problems. Underline them.*
*Analyze communicative behavior of all participants and compare it with communications in your cockpit in similar situations.*

***29.*** *Simulate radio communications in the following situations:*

1. Пилот сообщает, что у них не убираются шасси, запрашивает возврат на аэродром вылета.
2. Пилот сообщает, что у них проблема с шасси, просит пролет на малой высоте, чтобы с вышки посмотрели, выпущены ли шасси.
3. Экипаж сообщает, что будет садиться на «брюхо», спрашивает, могут ли запенить ВПП для них.
4. Экипаж сообщает , что у них не выпускаются закрылки, будут садиться без закрылков, скорость будет выше посадочной.

***Transcript***

| Source | Message | Translation |
|---|---|---|
| UAL 232 | Ah, we're controlling the turns by power. I don't think we can turn right. I think we can only make left turns. We're starting a little bit of a left turn right now. Maybe we can only turn right. We can't turn left. | Э, мы выполняем развороты при помощи тяги. Я думаю, мы не сможем разворачиваться вправо. Я думаю, мы можем выполнять только левые развороты. Прямо сейчас мы начинаем небольшой левый разворот. Может быть, мы можем разворачиваться только вправо. Мы не можем разворачиваться влево. |
| APP | United two thirty-two heavy, ah, understand you can only make right turns. | United два тридцать два тяжелый, э-э, понял так, что вы можете выполнять только правые развороты. |
| UAL 232 | That's affirmative. | Подтверждаю. |
| APP | United two thirty-two heavy, roger. Your present track puts you about eight miles north of the airport, sir. And, ah, the only way we can get you around [Runway 31] is a slight left turn with differential power. | United два тридцать два тяжелый, понял. Ваша нынешняя линия пути выводит Вас примерно в 8 милях севернее аэропорта, сэр. И, э-э, единственный способ, которым мы можем провести вас вокруг [ВПП 31], это плавный левый разворот с помощью разной тяги. |
| UAL 232 | Roger. Okay, we're in a right turn now. It's about the only way we can go. We'll be able to make very slight turns on final, but right now just ... we're gonna make right turns to whatever heading you want. | Понял. Хорошо, сейчас мы в правом развороте. Кажется, это единственный способ, которым мы можем следовать. Мы сможем выполнять небольшие довороты на прямой, однако сейчас только... мы выполним правые развороты на какой хотите курс. |
| APP | United two thirty-two heavy, roger. Ah, right turn, heading two five five. | United два тридцать два тяжелый, понял. Э-э, правый разворот, курс 255. |
| UAL 232 | Two five. | Два пять. |

| | | |
|---|---|---|
| ETM | This is United two thirty-two. We blew number two engine, and we've lost all hydraulics and we are only able to control, ah, level flight with the, ah, asymmetrical power settings. We have very little rudder or elevator. | Это United два тридцать два. У нас «полетел» двигатель номер два, и мы полностью потеряли гидравлику, и мы можем контролировать, э-э выравнивать полет только э-э установкой асимметричной тяги. У нас едва работают руль направления и руль высоты. |
| APP | United two thirty-two heavy, fly heading two four zero and say your souls on board. | United два тридцать два, курс 240 и сообщите, сколько у вас душ на борту. |
| MTN | United two thirty-two, understand that you lost number two engine totally, sir? | United два тридцать два, понял так, что вы полностью потеряли двигатель номер два, сэр? |
| UAL 232 | Say again. | Повторите. |
| APP | Souls on board, United two thirty-two heavy. | Количество душ на борту, United 232 тяжелый. |
| UAL 232 | Getting that right now. | Как раз сейчас получаю это. |
| ETM | That's affirmative. | Подтверждаю. |
| MTN | Your, ah, system one and system three? Are they operating normally? | Ваши, э-э, первая и третья системы? Они работают нормально? |
| ETM | Negative. All hydraulics are lost. All hydraulic systems are lost. The only thing we have is the ... [and he itemizes the systems that are working]. | Нет. Вся гидравлика не работает. Все гидравлические системы не работают. У нас есть только ... [и он перечисляет системы, которые работают]. |
| APP | United two thirty-two heavy, can you continue your turn to heading two four zero? | United 232 тяжелый, вы можете продолжить ваш разворот до курса 240? |
| UAL 232 | I don't know. We'll try for it. | Не знаю. Постараемся сделать. |
| MTN | Okay, United two thirty-two, understand you have normal power on one and three engines. | Окей, United 232, понял так, что у двигателей один и три нормальная тяга. |
| ENG | That's affirmative. | Подтверждаю |
| MTN | United two thirty-two, is all hydraulic quantity gone? | United 232, вся гидравлическая жидкость ушла? |
| ETM | Yes, all hydraulic quantity is gone. | Да, вся гидравлическая жидкость ушла. |
| APP | United two thirty-two heavy, souls on board and fuel remaining? | United 232 тяжелый, сколько душ на борту и остаток топлива? |
| UAL 232 | Souls on board and fuel remaining. We have thirty seven six [on fuel]. | [*Количество*] душ на борту и остаток топлива. У нас тридцать семь и шесть [топлива]. |
| APP | Roger. | Понял. |
| MTN | Okay, United two thirty-two, where you gonna set down? | Понятно, United два тридцать два, где сесть собираетесь? |
| ETM | We need some assistance right now. We can't ... we're having a hard time controlling it. | Нам прямо сейчас нужна кое-какая помощь. Мы не можем... Нам тяжело управлять им. |
| MTN | Okay, United two thirty-two. | Окей, United 232. |
| MTN | I'll try to help you. I'll pull out your flight manual. | Я попытаюсь вам помочь. Возьму ваше РЛЭ. |
| DIS | United two thirty-two, do you want to put that thing on the ground right now, or do you want to come to Chicago? | United 232, вы хотите сажать эту штуку сейчас или хотите лететь в Чикаго? |

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| ETM | Okay, we're, ah, we don't know what we'll be able to do. We don't think we're even gonna be able to get on the runway right now. We have no control hardly at all... | Ну, мы, э-э, мы не знаем, что сможем сделать. Думаем, что теперь даже на полосу не сможем вывести. Управляемость почти полностью потеряна... |
| ETM | Roger, we need any help we can get from Sam, as far as what to do with this. We don't have anything. We don't [know] what to do. We're having a hard time controlling it. We're descending. We're down to seventeen thousand feet. We have ... ah hardly any control whatsoever. | Понял, нам нужна любая помощь, которую мы можем получить от Сэма, что с этим делать. У нас ничего не осталось. Мы не знаем, что делать. Нам тяжело управлять им. Мы снижаемся. Снижаемся до 17000 футов. У нас... э-э, [мы] почти ничем не управляем. |
| DIS | Okay, copy that, two thirty-two. San Fran [is on the] line. Give them all the help you can. We'll get you expedited handling into Chicago, put you on the ground as soon as we can... | Так, запишите вот что, два тридцать два. Сан Франциско] на линии. Помогите им всем, чем можете. Мы обеспечим вам ускоренное обслуживание в Чикаго, поможем совершить посадку как можно скорее... |
| ETM | Well, we can't make Chicago. We're gonna have to land somewhere out here, probably in a field. | Так, мы не сможем [дотянуть до] Чикаго. Нам придется выполнять посадку где-то здесь, возможно, в поле. |
| MTN | United two thirty-two, we [understand that you] have to land the nearest airport, the nearest airport. Ah, I'm trying to find out where you've lost all three hydraulic systems. | United 232, мы [понимаем так, что вы] будете вынуждены совершать посадку в ближайшем аэропорту, ближайшем аэропорту. Э-э, я пытаюсь выяснить, как вы потеряли все три гидравлические системы. |
| ETM | That is affirmative. We have lost all three hydraulic systems. We have no quantity and no pressure on any hydraulic system... | Подтверждаю. Мы потеряли все три гидравлические системы. Ни в одной гидравлической системе не осталось ни жидкости, ни давления... |
| UAL 232 | Sir, we have no hydraulic fluid, which means we have no elevator control, almost none, and very little aileron control. I have serious doubts about making the airport. Have you got some place near there, ah, that we might be able to ditch? Unless we get control of this airplane we're gonna put it down wherever it happens to be. | Сэр, у нас нет гидравлической жидкости, что означает, что мы не можем управлять рулем высоты, почти совсем, и едва управляем элеронами. У меня серьезные сомнения, дотянем ли до аэропорта. Где-нибудь здесь есть место, э-э, где мы могли бы приводниться? Если мы не восстановим управляемость этого самолета, мы намерены сажать его, где придется. |
| MTN | Ah, United two thirty-two, you have lost all manual flight control systems? | Э-э, United 232, вы потеряли все системы ручного управления? |
| ETM | That's apparently true. | Определенно, это так. |
| MTN | United two thirty-two, ah, in the flight manual [on page] sixty?.. | United 232, э-э, в РЛЭ [на странице] 60?.. |
| ETM | I am on sixty-three. | Я на шестьдесят третьей. |
| APP | United two thirty-two heavy, can you hold that present heading, sir? | United 232 тяжелый, вы можете держать настоящий курс, сэр? |
| UAL 232 | Where's the airport now for [United] two thirty [-two]? We're turning around in circles. | Где сейчас находится аэропорт для [United] два тридцать [-два]? Мы кружим. |
| UAL 232 | Where's the airport to us now, as we come spinning down here? | Где от нас находится сейчас аэропорт, мы же кружим здесь. |
| APP | United two thirty-two heavy, Sioux City | United 232 тяжелый, аэропорт Су Сити |

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| | airport is about twelve o'clock and three six miles. | почти прямо по курсу и 36 миль. |
| MTN | United two thirty-two, I'm getting contact with flight ops right now. Standby please. | United два тридцать два, я прямо сейчас связываюсь со службами обеспечения. Подождите, пожалуйста. |
| UAL 232 | Sioux City, United two thirty-two, could you give us please your ILS frequency, the heading, and length of the runway? | Су Сити, United 232, дайте, пожалуйста, вашу частоту ИЛС, курс и длину ВПП. |
| APP | United two thirty-two heavy, affirmative. The localizer frequency is one zero nine point three and you're currently about thirty-five miles to north-east. It'll take about [heading] two two three five two four zero heading to join it. | United 232 тяжелый, подтверждаю. Частота ИЛС 109 точка 3, и сейчас вы около 35 миль к северо-востоку. Потребуется [курс] примерно два 235 240 для выхода. |
| MTN | United two thirty-two, this is Sam. | United два тридцать два, это Сэм. |
| ETM | Sam, two thirty-two. We're gonna try and put into Sioux City. | Сэм, 232. Будем пытаться и сажать в Су Сити. |
| DIS | Sam, this is dispatch. I haven't been able to copy two thirty-two. We're hearing a rumor that he's on approach to Sioux City airport. Last we heard he's at seventeen thousand feet and he may be too low for us to maintain contact with him. Go ahead... | Сэм, это ПДС. Я не смог записать 232. По слухам он на подходе к аэропорту Су Сити. Последнее, что мы слышали, он на 17000 футов, и, возможно, он слишком низко, чтобы мы могли поддерживать с ним связь. Продолжай... |
| APP | United two thirty-two, understand you are gonna try to make it into Sioux City. There's no airport out that way that can accommodate you, sir. | United 232, понял, вы попытаетесь садиться в Су Сити. По пути нет другого аэропорта, который мог бы принять вас, сэр. |
| UAL 232 | Okay, we'll head for Sioux City. We got a little bit of control back now. How long [is] your runway? | Хорошо, направляемся в Су Сити. Мы снова можем немного управлять. Какой длины ваша ВПП? |
| ETM | Two thirty-two is very busy right now. We're trying to go into Sioux City. We'll call you as soon as I can... | 232 сейчас очень занят. Пытаемся следовать в Су Сити. Вызовем вас, как только я смогу. |
| APP | Two thirty-two heavy, the airport, the runway is nine thousand feet long... | 232 тяжелый, аэропорт, длина ВПП 9000 футов... |
| MTN | He has no control. He's using that kind of sink rate, I believe. This is what he's doing. He's got his hands full for sure. | Он неуправляем. Думаю, он использует способ [управления] вертикальной скоростью снижения. Вот что он делает. У него, определенно, забот полон рот. |
| UAL 232 | Okay, thank you. | Хорошо, спасибо. |
| APP | United two thirty-two, did you get the souls on board count? | United 232, вы посчитали [количество] душ на борту? |
| UAL 232 | [Let me] tell you, right now we don't even have time to call the gal... | [Позвольте] сказать Вам, сейчас у нас нет времени даже чтобы вызвать... |
| APP | Roger. | Понял. |
| MTN | All hydraulic systems are gone... | Все гидравлические системы отказали... |
| APP | Okay, thank you. | Понял, спасибо. |
| UAL 232 | Two thirty-two, we're just gonna have to keep turning right. There's not much we can do about [turning] left. We'll try to come back around to the heading... | 232, нам придется продолжать разворачиваться вправо. Мы почти ничего не можем сделать, чтобы [повернуть] влево. Попытаемся развернуться вокруг на курс... |
| APP | United two thirty-two, roger. Need you | United 232, понял. Вам нужно на курс |

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| | on about a two-three-five heading, Sir, if you can manage that and hold that. | примерно 235, сэр, если сможете сделать это и поддерживать его. |
| UAL 232 | Well, we'll see what happens... | Хорошо, посмотрим, что получится... |
| UAL 232 | Where is Sioux City from our present position, United two thirty-two? | Где от нас сейчас находится Су Сити, United 232? |
| APP | United two thirty-two, it's about twenty on the heading and thirty-seven miles... | United 232, примерно по курсу двадцать и в 37 милях... |
| ETM | Go ahead with any help you can give us. | Ждем от вас любой помощи для нас. |
| MTN | United two thirty-two, understand that you have one and three engines operating. You have absolutely no hydraulic power. You have no control over the aircraft. Is that correct? | United 232, понимаю так, что у вас работают первый и третий двигатели. У вас совершенно не работает гидравлика. Вы не можете управлять самолетом. Это правильно? |
| MTN | Okay, United two thirty-two, I've got operational engineering on its way over here, and at the present time you are doing just about everything that you can possibly do. Your flaps and slats, I believe, are in the up position, are they not? | Хорошо, United 232, я собрал здесь эксплуатационный инженерный состав, и в настоящее время вы делаете едва ли не все, что можете. Ваши закрылки и предкрылки, думаю, убраны, правильно? |
| APP | When you get turned to that two-forty heading, sir, the airport will be about twelve o'clock and thirty-eight miles. | Когда развернетесь на курс 240, сэр, аэропорт будет почти прямо по курсу и в 38 милях. |
| UAL 232 | Okay, we're trying to control it just by power alone now. We have no hydraulics at all, so we're doing our best here. | Окей, сейчас мы пытаемся управлять только тягой. У нас совсем не работает гидравлика, так что мы делаем все, что можем. |
| APP | Roger, and we've notified the equipment out in that area, sir. The equipment is standing by. | Понял, и мы предупредили все аварийные службы в той зоне, сэр. Аварийные службы ждут. |
| ETM | That is affirmative. That is affirmative. That is affirmative. Do you read? | Подтверждаю. Подтверждаю. Подтверждаю. Слышите? |
| MTN | United two thirty-two, in your handbook on page I ninety-one, I ninety-one... | United 232, в вашем руководстве на странице И-91, И-91... |
| ETM | We already have a no flap-no slat made up and we're getting ready. We're gonna try to put into Sioux City with gear down. | Мы уже подготовились к посадке без закрылков и предкрылков. Попробуем сесть в Су Сити с выпущенными шасси. |
| MTN | United, you're trying to go into Sioux City. We'll contact Sioux City and have emergency equipment available. | United, вы пытаетесь следовать в Су Сити. Мы свяжемся с Су Сити и подготовим аварийно-спасательное оборудование. |
| ETM | Okay, we will be trying to get in there. | Да, мы будем пытаться попасть туда. |
| MTN | Okay, United two thirty-two, I'll stay with you. | Хорошо, United 232, я останусь с вами. |
| UAL 232 | United two thirty-two, we're gonna have to continue one more right turn. We got the elevators pretty much under control within three or four hundred feet but we still can't do much with the steering. | United 232, нам придется выполнить еще один правый разворот. Рули высоты довольно хорошо слушаются в пределах 300 или 400 футов, но управляемость по курсу все еще слабая. |
| APP | United two thirty-two heavy, roger. Understand you [have] the elevators possibly under control [enough to hold] altitude? | United 232 тяжелый, понял. Правильно понимаю: рули высоты слушаются достаточно хорошо, чтобы вы могли держать высоту? |

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| UAL 232 | Negative. We don't have it, but we are better, that's all. | Нет. Рули не работают, но уже получше, вот и все. |
| APP | Roger. | Понял. |
| UAL 232 | How far is the field now, please? | Как далеко аэродром, пожалуйста? |
| APP | United two thirty-two heavy, you're currently thirty-three miles north-east. | United 232 тяжелый, вы сейчас в 33 милях к северо-востоку. |
| UAL 232 | Thank you. | Спасибо. |
| APP | United two thirty-two heavy, there are a couple of really small airports out in the vicinity here, and Storm Lake is four thousand two hundred feet by seventy-five. That's about fifteen miles east of your position. | United 232 тяжелый, здесь рядом пара совсем маленьких аэропортов, и в Сторм Лейке 4200 футов на 75. Это примерно 15 миль восточнее вас. |
| UAL 232 | Roger, we're still going down trying to control it. As we get down a little lower here we'll pick it out. | Понял, мы все еще снижаемся, пытаясь управлять. Как только еще немного снизимся, будем его вытаскивать. |
| MTN | Okay, United two thirty-two, you have a lot of damage to the tail section? | Так, United 232, у вас значительные повреждения в хвостовой части? |
| ETM | The leading edge of the elevator is damaged. I mean, there's damage there that I can see. I don't know how much [there] is that I cannot see. I can see it on the leading edge, on the outer parts. | Повреждена передняя кромка руля высоты. Я имею в виду повреждение, которое я вижу. Не знаю, сколько я не вижу. Я могу видеть это на передней кромке, на внешних частях. |
| MTN | United two thirty-two, Engineering is assembling right now, and they're listening to us. | United 232, инженеры сейчас собираются, и они слушают нас. |
| ETM | Okay, number two engine blew. Severe shudders and vibration through the airplane when it blew. Then we tried to pull the throttle back on number two, it wouldn't come back. It was frozen. We shut it down turned off the fuel in that, pulled the fire handle on it, and we have only been able to hold direction control through power application... We're down to nine thousand now and we're trying to make Sioux City. We're gonna have to use alternate gear to get the gear down. I think we're gonna be kind of busy here. If there's anything I can talk to you about, I'll try to. If there's anything you can give for suggestions, give me a holler. | Окей, двигатель номер два разрушился. Сильная тряска и вибрация по самолету, когда он разрушался. Затем мы пытались убрать РУД второго, он не сдвигался. Он был в зафиксированном положении. Мы его выключили, перекрыли топливо к нему, включили тумблер пожаротушения, и можем выдерживать направление, только управляя тягой... Сейчас мы снизились до 9000, и мы пытаемся дотянуть до Су Сити. Нам придется использовать аварийный выпуск шасси. Думаю, мы здесь будем типа заняты. Если смогу о чем-то вам сказать, скажу. Если у вас будет что предложить, вызывайте меня. |
| APP | United two thirty-two heavy, there is a small airport at twelve o'clock and seven miles. The runway is four thousand feet long there. | United 232 тяжелый, маленький аэропорт прямо по курсу и в семи милях. Длина ВПП там 4000 футов. |
| UAL 232 | Hey, I'm controlling it myself now. As soon as the captain gets back on, he'll give me a hand here. He's talking on the PA. | Эй, сейчас управляю им я. Как только капитан закончит, он мне поможет. Он говорит по громкоговорящей связи. |
| UAL 232 | Okay, United two thirty-two, we're starting to turn back to the airport. Since we have no hydraulics braking [it's] gonna really be a problem. Would | Так, United 232, мы начинаем разворот обратно к аэропорту. Так как у нас не работает тормозная гидравлика, [это] будет реальной проблемой. [Мы] бы |

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| | suggest the equipment be toward the far end of the runway. I think under the circumstances, regardless of the condition of the airplane when we stop, we're going to evacuate. So you might notify the ground crew that we're gonna do that. | предложили направить аварийно-спасательное оборудование к дальнему концу ВПП. Думаю, в этой ситуации независимо от состояния самолета мы будем эвакуировать *(пассажиров)* после остановки. Можете предупредить об этом наземный персонал. |
| APP | United two thirty-two heavy, wilco, sir. If you can continue that left turn to about two-twenty heading, sir, that'll take you right to the airport. | United 232 тяжелый, будет выполнено, сэр. Если сможете продолжить левый разворот примерно на курс 220, сэр, он выведет вас прямо на аэропорт. |
| UAL 232 | Two-twenty, roger. | 220, понял. |
| UAL 232 | What's your ceiling right now? | Какая у вас сейчас нижняя кромка? |
| APP | Ah, ceiling is four thousand, broken, and visibility's one five underneath it. | Э-э, нижняя граница 4000, значительная, и видимость под ней 15. |
| UAL 232 | And the airport elevation? | А превышение аэропорта? |
| APP | One thousand ninety-eight. | Тысяча девяносто восемь. |
| UAL 232 | How far are we away from the airport now? | Как далеко мы от аэропорта сейчас? |
| APP | Thirty-five miles, and if you continue that left turn about another fifteen or twenty degrees it'll take you right to the runway. | 35 миль, и если развернетесь влево еще примерно на 15 или 20 градусов, выйдете прямо на ВПП. |
| UAL 232 | Okay. We don't have a localizer or a glide slope, so... | Окей. У нас нет ни курсового маяка, ни глиссады, так что… |
| APP | Yes, sir. You're well too far north of it now. | Да, сэр. Вы сейчас далеко на север от них. |
| UAL 232 | Okay. | Окей. |
| MTN | United two thirty-two, one more time. No hydraulic quantity, is that correct? | United 232, еще раз. Совсем нет гидравлической жидкости, правильно? |
| UAL 232 | Now we gotta level off a little bit. We're six thousand feet above the field right [now]. | Сейчас мы должны немного выровнять. Мы (сейчас) на 6000 футов над аэродромом. |
| ETM | Affirmative, affirmative, affirmative. | Подтверждаю, Подтверждаю, Подтверждаю. |
| APP | United two thirty-two heavy, your present heading looks good. | United 232 тяжелый, похоже, вы на правильном курсе. |
| UAL 232 | We'll see how close we can come to holding it. | Посмотрим, как близко мы сможем подойти, удерживая ее. |
| APP | United two thirty-two heavy, can you still make the slight right turns? | United 232 тяжелый, вы все еще можете выполнять небольшие развороты вправо? |
| UAL 232 | Yeah. Right turns are no problem, just left turns... | Ага. Правые развороты – не проблема, а вот левые - … |
| APP | Roger. | Понял. |
| APP | United two thirty-two heavy, Sir, you are well too far north. | United 232 тяжелый, сэр, вы ушли довольно далеко на север. |
| UAL 232 | We know. | Знаем. |
| APP | Two thirty-two heavy, your present heading is a little close, Sir. Can you make a shallow left turn about ten degrees or so? | 232 тяжелый, с вашим курсом подойдете слишком близко, сэр. Вы можете выполнить небольшой левый доворот 10 градусов или около того? |
| UAL 232 | I'll try. | Попытаюсь. |
| UAL 232 | Where's the airport? | Где аэропорт? |
| APP | United two thirty-two, the airport's currently twelve o'clock and two one | United 232, аэропорт сейчас прямо по курсу и в 21 миле. |

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| | miles. | |
| APP | United two thirty-two heavy, you're gonna have to widen out just slightly to your left, Sir, to make the turn to final and also it'll take you away from the city. | United 232 тяжелый, вам придется протянуть немного влево, сэр, чтобы выполнить доворот на предпосадочную прямую, а также это отведет вас от города. |
| UAL 232 | Whatever you do, keep us away from the city. | Что бы вы ни делали, держите нас подальше от города. |
| APP | United two thirty-two heavy, fly heading one eight zero, one eighty... | United 232 тяжелый, следуйте курсом один восемь ноль, сто восемьдесят... |
| UAL 232 | I don't think we can do that, but we'll try. | Не думаю, что у нас получится, но попытаемся. |
| APP | You are currently one seven miles north-east of the airport. You're doing good... | Вы сейчас в 17 милях северо-восточнее аэропорта. Вы правильно делаете... |
| UAL 232 | It has to be a right turn to one eighty. We can't do anything about it... | Нам нужно вправо на [курс] 180. Мы ничего не можем с этим поделать... |
| APP | United two thirty-two heavy, there's a tower five miles off to your right side that's three thousand four hundred... in height. | United 232 тяжелый, Справа от вас в пяти милях вышка 3400 футов... высотой. |
| UAL 232 | Roger. | Понял. |
| APP | United two thirty-two heavy, how steep a right turn can you make, sir? | United 232 тяжелый, насколько энергично вы можете выполнить правый разворот, сэр? |
| APP | United two thirty-two heavy, if you can hold that altitude, Sir, the right turn to one eighty would put you on about ten miles east of the airport. | United 232 тяжелый, если можете поддерживать эту высоту, сэр, правый разворот на *(курс)* 180 выведет вас примерно в 10 милях восточнее аэропорта. |
| UAL 232 | That's what we're trying to do. | Именно это мы и пытаемся сделать. |
| APP | United two thirty-two heavy, roger. Turn right heading one eight zero. | United 232 тяжелый, понял. Разворачивайтесь вправо, курс 180. |
| UAL 232 | One eighty. | 180. |
| APP | United two thirty-two heavy, 'been advised there is a four-lane highway up in that area, Sir, if you can pick that up. | United 232 тяжелый, мне сообщили, в том районе есть четырехполосная автострада, сэр, если можете видеть ее. |
| UAL 232 | Okay, we'll see what we can do here. We've already put down the gear and we're gonna have to be putting [down] on something solid if we can... | Окей, посмотрим, что мы тут можем сделать. Мы уже выпустили шасси и намерены садиться на что-нибудь твердое, если получится... |
| UAL 232 | We've got about three or four minutes to go, [it] looks like. | Похоже, нам еще примерно 3 или 4 минуты лететь. |
| APP | United two thirty-two heavy, roger. Can you pick up a road or something up there? | United 232 тяжелый, понял. Вы видите там дорогу или что-то еще? |
| UAL 232 | We're trying it. Still anywhere from two thousand up to fifteen hundred feet, down now, in waves. | Мы пытаемся. Все еще где-то между 2000 и 1500 футов, снижаемся волнообразно. |
| APP | United two thirty-two heavy, the airport is about eighteen miles south-east of your position, about two-twenty on the heading, but we're gonna need you southbound away from the city first. If you can hold one-eighty heading... | United 232 тяжелый, аэропорт около 18 миль юго-восточнее вашего места, на курсе примерно 220, однако нам нужно сначала увести вас на юг подальше от города. Если вы можете держать курс 180... |

| | | |
|---|---|---|
| UAL 232 | We're trying, trying to get to it right now. | Мы пытаемся, пытаемся выйти на него сейчас. |
| APP | United two thirty-two heavy, advise if you can pick up a road or anything where you can possibly land it on that. | United 232 тяжелый, сообщите, если увидите дорогу или что-то еще, куда, возможно, сможете его посадить. |
| UAL 232 | Okay, we're a hundred eighty degree heading. Now what do you want? | Хорошо, мы на курсе 180. Что вы хотите сейчас? |
| APP | United two thirty-two, if you can hold the attitude, the one-eighty heading will work fine for about seven miles. | United 232, если вы сможете удерживать положение самолета, курс 180 на протяжении примерно 7 миль – это будет отлично. |
| UAL 232 | Okay, we're trying to turn back. | Хорошо, мы пытаемся развернуться назад. |
| APP | United two thirty-two heavy, can you hold that heading, sir? | United 232 тяжелый, вы можете держать этот курс, сэр? |
| UAL 232 | Yeah, we're on it now for a little while. | Да, мы пока на нем. |
| APP | United two thirty-two heavy, roger. That heading will put you currently fifteen miles north-east of the airport. If you can hold that, it'll put you on about a three-mile final. | United 232 тяжелый, понял. Этот курс выведет вас в 15 милях северо-восточнее аэропорта. Если сможете его держать, он выведет вас на примерно трехмильную прямую. |
| UAL 232 | Okay, we're giving it heck. | Хорошо, стараемся. |
| APP | United two thirty-two heavy, the airport's currently twelve o'clock and one three miles. | United 232 тяжелый, аэропорт сейчас прямо по курсу и 13 миль. |
| UAL 232 | Okay, we're looking for it. | Хорошо, мы ищем его. |
| UAL 232 | Field elevation is what again? | Превышение аэродрома какое, еще раз? |
| APP | Ah, eleven hundred feet, one thousand one hundred... | Э-э, 1100 футов, 1100... |
| UAL 232 | Okay, thank you. | Окей, спасибо. |
| UAL 232 | We're starting down a little bit now. We got a little better control of the elevator. | Мы начинаем сейчас понемногу снижаться. Руль высоты слушается немного лучше. |
| APP | United two thirty-two heavy, roger. The airport's currently at your one o'clock position, one zero miles. | United 232 тяжелый, понял. Аэропорт сейчас справа под 30, 10 миль. |
| APP | United two thirty-two heavy, if you can't make the airport, sir, there is an interstate that runs north to south, to the east side of the airport. It's a four-lane interstate. | United 232 тяжелый, если не сможете выйти на аэропорт, сэр, к востоку от аэропорта с севера на юг проходит автострада. Четырехполосная автострада. |
| UAL 232 | We're just passing it right now. We're gonna try for the air[port]. | Как раз проходим мимо нее сейчас. Будем пытаться [дотянуть] до аэропорта. |
| UAL 232 | We have the runway in sight. We have the runway in sight. We have the runway in sight. We'll be with you shortly. Thanks a lot for your help. | Полосу наблюдаем. Полосу наблюдаем. Полосу наблюдаем. Скоро будем у вас. Большое спасибо за помощь. |
| APP | United two thirty-two heavy, the wind's currently three six zero at one one three sixty at eleven. You're cleared to land on any runway... | United 232 тяжелый, ветер сейчас три шесть ноль *(скорость)* один один, 360 *(скорость)* одиннадцать. Посадку разрешаю на любую ВПП... |
| UAL 232 | [Laughter] Roger. [Laughter] You want to be particular and make it a runway, | (Смех) Понял. (Смех) Хотите быть точными, думаете, попадем на полосу, |

| | | |
|---|---|---|
| | huh? | да? |
| UAL 232 | Say the wind one more time. | Сообщите ветер еще раз. |
| APP | Wind's zero one zero at one one... | Ветер 010, *(силой)* одиннадцать. |
| UAL 232 | Okay, we're all three talking at once. Say it again one more time. | Окей, мы втроем сразу говорим все вместе. Повторите еще раз. |
| APP | Zero one zero at one one, and there is a runway that's closed, sir. It runs north-east to southwest. | 010 *(силой)* одиннадцать, и есть ВПП, которая закрыта, сэр. Она идет с северо-востока на юго-запад. |
| UAL 232 | We're pretty well lined up on this one here... | Мы довольно неплохо нацелились на эту... |
| APP | United two thirty-two heavy, roger, sir. That's a closed runway, sir. We're getting the equipment off the runway. They'll line up for that one. | United 232 тяжелый, вас понял, сэр. Это закрытая ВПП, сэр. Мы убираем аварийные службы с ВПП. Они выстроятся у той. |
| UAL 232 | How long is it? | Какая длина? |
| APP | Sixty-six hundred feet, six thousand six hundred. Equipment's coming off. | 6600 футов, шесть тысяч шестьсот футов. Оборудование убирают. |
| APP | At the end of the runway it's just wide open field. | В конце ВПП широкое поле. |

UAL 232 – flight crew
APP – Approach Control
MTN – airline maintenance base
DIS – airline dispatcher

## UNIT 8

### *Fuel system*

1. *a) Read the text. Answer the questions.*
   *(P) Compare the described fuel system with fuel system aboard the aircraft you fly.*

Most modern aircraft are equipped with two or more fuel tanks (or cells). Each fuel tank is equipped with a drain valve located at the lowest point in the tank. This drain allows the pilot during preflight walk-around to check for and drain off any water which may have accumulated in the fuel tank. There is usually another drain located at the lowest part of the fuel piping system. This valve must also be drained during pre-flight to eliminate any water which may have accumulated in the fuel lines.
A vent line allows air to enter the tank as fuel is used. During hot weather, fuel may expand and overflow through the vent when tanks are full.
A fuel selector valve located inside the cockpit allows the pilot to select which tank(s) are to be in use during flight. Usually, the selector should be set to both for take-off and landing. Pilots of low wing aircraft should exercise caution in their fuel management if tank selection is other than both. Running a tank dry can cause the engine to quit and vapor lock to occur in the fuel lines. It may be impossible to restart the engine under these conditions.
There is a fuel gauge in the cockpit for each fuel tank. The lower 1/4 of the fuel gauge indication is marked with a red line as a caution to the pilot of a low fuel condition. The pilot should never rely on the fuel gauge as the sole measure of fuel remaining. The gauges on aircraft are subject to a variety of indicator errors. The pilot should therefore double check the fuel remaining based on the power setting of the engine in flight and time in flight.

*b) Work as a class. Answer the teacher's questions.*

2. *a) Listen to the story and define the main cause of the crash.*

*b) Read the explanation of the main cause and contributing factors:*

PROBABLE CAUSE: "The failure of the flight crew to adequately manage the airplane's fuel load, and their failure to communicate an emergency fuel situation to air traffic control before fuel exhaustion occurred. Contributing to the accident was the flight crew's failure to use an airline operational control dispatch system to assist them during the international flight into a high-density airport in poor weather. Also contributing to the accident was inadequate traffic flow management by the FAA and the lack of standardized understandable terminology for pilots and controllers for minimum and emergency fuel states. The Safety Board also determines that wind shear, crew fatigue and stress were factors that led to the unsuccessful completion of the first approach and thus contributed to the accident."

3. *Work with a partner. Discuss in what way the pilot can advise the controller of a similar problem with fuel.*

***Decompression, pressurization problem***

4. *Read the text:*

**Cabin pressurization** is the active pumping of compressed air into an aircraft cabin when flying at altitude to maintain a safe and comfortable environment for crew and passengers in the low outside atmospheric pressure.

Pressurization is essential over 3,000 m (10,000 ft) to prevent crew and passengers from becoming unconscious through the lack of oxygen (hypoxia) in the thin air above that altitude.

Failure of cabin pressurization above 3000 m (10,000 ft) for whatever reason is called **decompression or depressurization** and requires an emergency descent to below 10,000ft. The Federal Aviation Administration recognizes three distinct types of decompression events in aircraft:

- Explosive decompression
- Rapid decompression
- Gradual decompression

5. *Look at the photo and tell what type of decompression has experienced this flight?*

4-28-1988 After 89,090 flight cycles on a 737-200, metal fatigue lets the top go in flight.

6. *Read and put in appropriate terms according to their explanations:*

_____ occurs at a rate faster than that at which air can escape from the lungs, typically in less than 0.1 to 0.5 seconds. The risk of lung trauma is very high. After an explosive decompression, a heavy fog may immediately fill the aircraft.

_____ typically takes more than 0.1 to 0.5 seconds, allowing the lungs to decompress faster than the cabin. The risk of lung damage is still present, but significantly reduced compared to explosive decompression.

_____ occurs slowly enough to go unnoticed and might only be detected by instruments. This type of decompression may also come about from a failure to pressurize as an aircraft climbs to altitude.

7. *Read the text and discuss with a partner effects of decompression. What can eliminate these effects?*

Rapid decompression of commercial aircraft is a rare, but dangerous event. People seated close to a very large hole may be forced out by explosive decompression or injured by exiting debris and unsecured cabin objects.

Gradual or slow decompression, sometimes caused by a failure to pressurize the cabin with an increase in altitude, is dangerous because it may not be detected. Warning systems may be ignored, misinterpreted or fail and self-recognition of the subtle effects of hypoxia really depends upon previous experience and hypoxia familiarization training. Hypoxia may result in loss of consciousness without emergency oxygen.

Failure of cabin pressurization above 3000 m (10,000 ft) requires an emergency descent to below 10,000ft and the deployment of an oxygen mask above each seat. In almost all pressurized jet airliners passenger oxygen masks are automatically deployed when the cabin altitude exceeds 14,000 feet.

It is generally impossible to lose pressurization through opening a cabin door in flight, either accidentally or intentionally. If the pressure inside the cabin exceeds the pressure outside the doors are forced shut and will not open until the pressure is equalized.

Aircraft emergency oxygen systems are emergency equipment fitted to commercial aircraft, intended for use when the cabin pressurization system has failed and the level of oxygen in the cabin atmosphere drops below a safe level. It consists of a number of personal oxygen masks by passenger seats, and some form of central oxygen generator.

Most commercial aircraft are pressurized at a maximum cabin altitude of 8,000 feet, where it is possible to breathe normally without an oxygen mask. If the cabin altitude reaches 14,000 feet or higher, or a decompression occurs and hypoxia is possible, compartments containing the oxygen masks will open automatically, either above or in front of the passenger and crew seats, and in the lavatories. Oxygen masks may also drop on extremely rough landings or during severe turbulence if the oxygen mask panel becomes loose.

8. *A list of notable aircraft decompression incidents is given in the table below. Look through the table and discuss in groups:*

*a) what types of decompression occur most often?*
*b) What is the most common reason for a decompression?*

| Flight | Date | Type | Event | Fatalities/of # on board | Decompression Type | Cause |
|---|---|---|---|---|---|---|
| South African Airways Flight 201 | 1954 | | Accident | 21/21 | Explosive decompression | Metal fatigue |
| American Airlines Flight 96 | 1972 | DC-10 | Accident | 0/67 | Rapid decompression | Cargo door failure |
| Turkish Airlines Flight 981 | 1974 | DC-10 | Accident | 346/346 | Explosive decompression | Cargo door failure |
| Japan Airlines Flight 123 | 1985 | Boeing 747 | Accident | 520/524 | Explosive decompression | Structural failure of rear pressure bulkhead |
| Aloha Airlines flight 243 | 1988 | Boeing 737 | Accident | 1/95 | Explosive decompression | Metal fatigue |
| United Airlines Flight 811 | 1989 | Boeing747 | Accident | 9/345 | Explosive decompression | Cargo door failure |
| British Airways Flight 5390 | 1990 | BAC One-Eleven | Incident | 0/87 | Rapid decompression | Windscreen failure |
| South Dacota Learjet | 1999 | Learjet 35 | Accident | 6/6 | Gradual or rapid decompression | (Undetermined) |
| China Airlines Flight 611 | 2002 | Boeing 747 | Accident | 225/225 | Explosive decompression | Metal fatigue |
| Helios Airways Flight 522 | 2005 | Boeing 737 | Accident | 121/121 | Gradual decompression | Automatic pressurization system disabled |
| Qantas Flight 30 | 2008 | Boeing 747 | Incident | 0/365 | Rapid decompression | Oxygen cylinder explosion |

*Share your ideas as a class.*

9. *Match nouns and verbs:*

| | |
|---|---|
| a) Warning light | 1) fix |
| b) Autopilot | 2) experience |
| c) Engine | 3) quit |

d) Problem
e) Alarm
f) Lack of oxygen
g) Holding pattern

4) illuminate
5) enter
6) sound
7) disengage

***10.** Read the story. Replace italicized words with synonyms where possible or paraphrase them.*

***Crew confusion found in Athens plane crash***

By Don Phillips, International Herald Tribune
Wednesday, September 7, 2005

PARIS. The crew members of a Cypriot airliner that crashed Aug. 14 near Athens became confused by a series of *alarms* as the plane climbed, failing to recognize that the cabin was not pressurizing until they grew mentally disoriented because of *lack of oxygen* and *passed out*, according to several people connected with the investigation.

Complicating the cockpit *confusion*, neither the German pilot nor the young, inexperienced Cypriot co-pilot could speak the same language fluently, and each had difficulty understanding how the other spoke English, the worldwide language of air traffic control.

A total of 121 people were killed in the crash after the plane climbed and *flew on autopilot*, circling near Athens as it was programmed to do until one *engine stopped running* because of *a lack of fuel*. The sudden *imbalance of power*, with only one engine operating, caused the *autopilot to disengage* and the plane to begin its final descent.

The plane that crashed, a Boeing 737, underwent maintenance the night before. The *maintenance crew set* the *pressurization valve* and *an air outflow valve* incorrectly. The crew did not *catch the mistake* during *preflight checks* the next day. This meant that the plane could not *pressurize*.

At 10,000 feet, or 3,000 meters, as designed, an alarm went off to *warn* the crew that the plane would not pressurize. However, the crew members mistakenly thought that the alarm horn was a warning to tell them that their *controls* were not set properly for takeoff, the officials said.

The same *horn* is used for both conditions, although it will sound for *takeoff configuration* only while the plane is still on the ground.

The crew continued the climb on autopilot. At 14,000 feet, *oxygen masks deployed* as designed and a *master caution light illuminated* in the cockpit. Another *alarm sounded* at about the same time on an unrelated matter, warning that there was *insufficient cooling air* in the *compartment housing avionics equipment*.

The radio tapes showed that this created tremendous confusion in the cockpit. Normally an aircraft cabin is held at 8,000 feet pressure, so the crew at over 14,000 feet would already be *experiencing* some *disorientation* because of a *lack of oxygen*.

During this time, the German captain and the Cypriot co-pilot discovered they had no common language and that their English, while good enough for normal air traffic control purposes, was not good enough for complicated technical conversation in *fixing the problem*.

The crew members called the maintenance base in Cyprus and were told that the *circuit breaker* to turn off the loud new alarm was in a cabinet behind the captain. The captain got up from his seat to look for the circuit breaker, apparently ignoring the confused co-pilot.

As the plane continued *to climb on autopilot*, the air grew so thin that the crew became seriously *impaired*. The captain *passed out* first on the floor of the cockpit, followed by the co-pilot, who remained in his seat, according to the officials.

The autopilot did as it was programmed to do, flying the plane at 34,000 feet to Athens and *entering a holding pattern*. It remained in a long circling pattern, shadowed by Greek *military jets*, until fuel ran low and one *engine quit.*

- *Answer the questions:*

1) What was the operating company of the flight that crashed Aug. 14 2005 near Athens?
2) Why did the crew pass out?
3) Why could the aircraft not pressurize?
4) Did the crew notice the warnings? Were they aware of the problem?
5) Did the crew control the flight or did they fly on autopilot?
6) Were the crew conscious when the plane entered the holding pattern?
7) What were the nationalities of the captain and co-pilot?
8) Was English language proficiency of the crewmembers sufficient to communicate in an emergency situation? Please explain.

- *Retell the story as if you were*

  *a) the military pilot escorting that plane to its final descent;*

  *b) the controller guiding that plane.*

***11***. *Work in pairs. Make dialogues.*

1) P сообщите диспетчеру об аварийном снижении из-за мгновенной разгерметизации.
   C подтвердите получение информации и предупредите другие борты.

2) P сообщите, что у вас высота в кабине выше нормы, попросите эшелон пониже.
   C предупредите, что снизу борт пересекает слева направо. Через некоторое время скажите, что с бортом разошлись, разрешите снижение.

3) P вы в наборе обнаруживаете неполадки с наддувом, попросите задержаться на эшелоне ...
   C разрешите следовать на эшелоне, спросите о намерениях экипажа. После доклада пилота об устранении неполадок разрешите набор.

4) P сообщите, что у вас индикация открытой двери багажного отсека, запросите возврат на перрон.
   C разрешите, попросите доложить, когда будут готовы к вылету.

### *Bird strike*

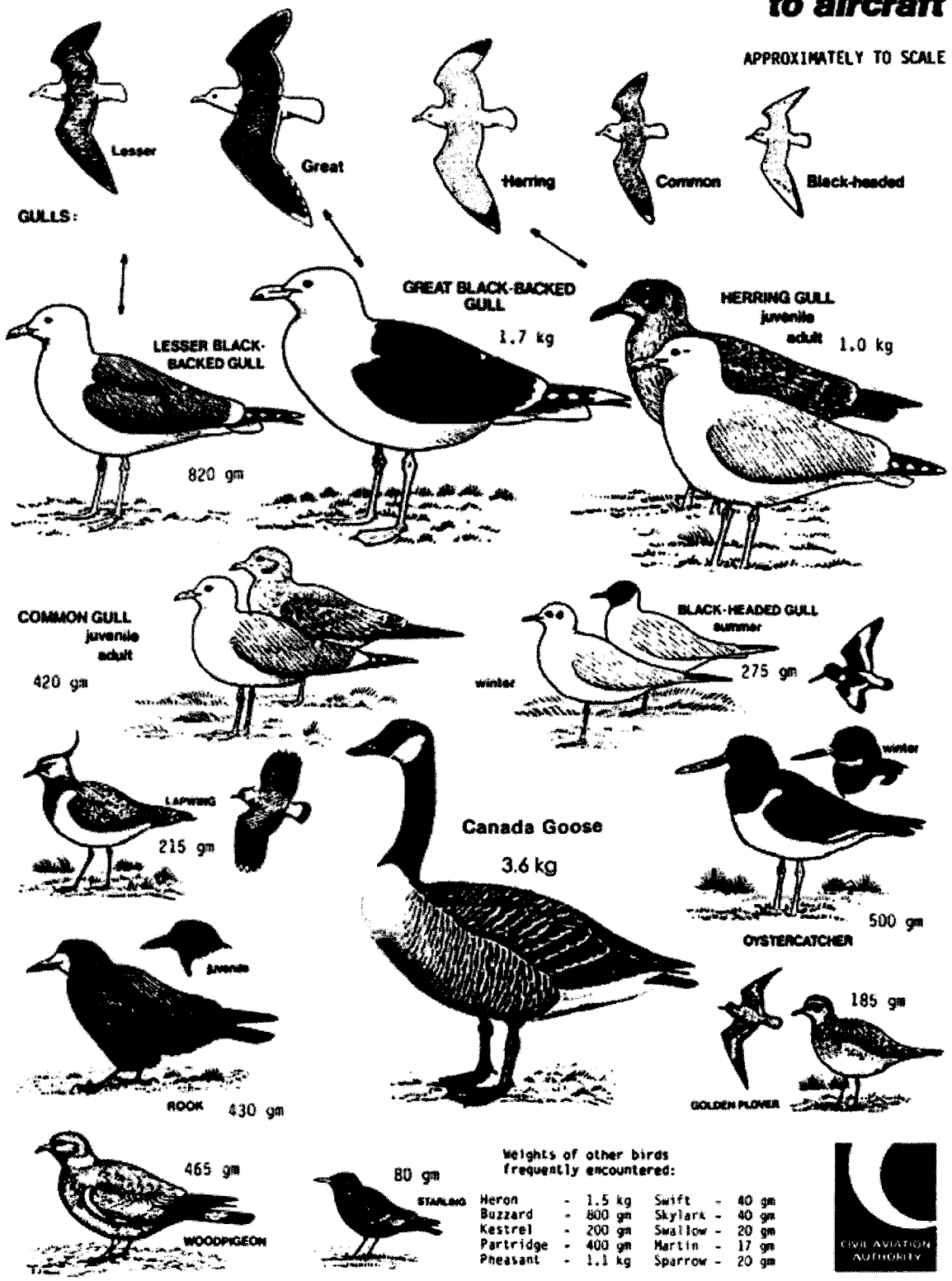
***12.*** *Listen and retell the content of both exchanges.*

***13.*** *Look through the list of birds; refer to the next page for their size and weight and mark those that can be a hazard to an aircraft:*

| | |
|---|---|
| gull (lesser) | чайка |
| lapwing | чибис |

| | |
|---|---|
| oyster catcher | кулик-сорока |
| rook | грач |
| goose (geese) | гусь |
| golden plover | золотистая ржанка |
| starling | скворец |
| wood pigeon | вяхирь |
| heron (wader, egret) | цапля |
| buzzard | сарыч или гриф |
| kestrel | пустельга |
| falcon | сокол, ястреб |
| partridge | куропатка |
| pheasant | фазан |
| swift | стриж |
| skylark | жаворонок |
| swallow | ласточка |
| martin | городская ласточка |
| sparrow | воробей |
| bullfinch | снегирь |
| cuckoo | кукушка |
| duck | утка |
| woodpecker | дятел |
| eagle | орел |
| flamingo | фламинго |
| magpie | сорока |
| owl | сова |
| parrot | попугай |
| peacock | павлин |
| pelican | пеликан |
| pigeon | голубь |
| raven | ворона |
| stork | аист |
| swan | лебедь |
| turkey | индюк |
| waterfowl | водоплавающая дичь |

# LOOK OUT FOR THESE BIRDS - they can be a hazard to aircraft



**14.** *Read the article; explain the meaning of underlined words or paraphrase them.*

## *Birds and aircraft are competing for space in crowded skies*

*Dr. Richard A.Dolbeer*
*Department of Agriculture (United States)*

Birds and other wildlife are an increasing problem for the aviation industry. There are a number of reasons for this worsening trend. While the number of large birds has been on the rise, it is noteworthy that most aircraft components, including engines, are not tested or certified for collisions with birds weighing more than 1.8 kilograms. There have been a number of strikes causing significant damage, including uncontained engine failures and cockpit penetrations, with birds weighing much less than 1.8 kilograms.
Many birds have adapted to urban environments and find that airports, which offer expansive areas of grass and pavement, are attractive habitats for feeding and resting. Other wildlife, such as deer and wild dogs, are attracted to airport environments for similar reasons.
At least 195 people have died and 168 aircraft have been destroyed as a consequence of bird and other wildlife strikes with civil and military aircraft since 1988, according to unpublished data collected by a number of scientists, including the author.

*Mitigating the risk*
There are a number of measures that airport authorities can take to minimize the hazards posed by wildlife. One important step is to ensure that they comply with the ICAO standards regarding bird hazards to aviation. These call for authorities to:

- assess the extent of the hazard posed by birds on and in the vicinity of airports;
- take necessary action to decrease the number of birds; and
- eliminate or prevent the establishment of any site in the vicinity of the airport which would be an attraction to birds and thereby present a danger to aviation.

Based on the findings of the assessment of bird and wildlife hazards, airports should develop and implement a wildlife hazard management plan. These plans involve the use of various techniques, ranging from netting, pyrotechnics, lasers and even patrols with trained falcons or dogs, to exclude, disperse or remove hazardous wildlife.
Airports and air carriers need to provide pilots, mechanics, maintenance and ground personnel with following information.
The world height record for a bird strike is 37,000 feet. In the United States, bird strikes have been reported up to 32,000 feet , but most collisions (57 percent) causing substantial damage occur below 100 feet. The pilots should avoid high speed flight below 10,000 feet, since speed is an important factor in the type of damage caused by a strike. This is because the damaging force of a bird strike is generated by mass times velocity squared.
More strikes occur during landing. Pilots should not assume that birds will detect the aircraft in time to avoid the strike. Studies have indicated that about 80 percent of birds will attempt to avoid approaching aircraft, but their avoidance reaction may be too late or inappropriate. One explanation is that birds often face into the wind when standing and usually take-off and land into the wind, which means that they face away from an approaching aircraft at airports.
Many bird species, including geese and ducks migrate at night. Waterfowl will also actively feed at night. If left undisturbed, gulls and other species will sometimes rest on runways overnight.

In North America, the period of July-November, and especially the month of August, is the worst period for damaging bird strikes below 500 feet AGL. In the Northern hemisphere, bird populations are at the highest levels during late summer and contain many young birds that are not skilled flyers. The periods of September-November and April-May are the most dangerous seasons because these are the peak times for migration.
More strikes occur on rainy days. This might be related to the greater abundance of invertebrate food (such as earthworms) at the soil surface during wet weather and the tendency of birds such as gulls to wait out storms by standing on pavement.
There is no scientific evidence yet, that the strategies such as the use of electromagnetic signals, landing light pulse and wave-length frequency, and the reflective characteristics of aircraft paint can reduce the probability of strikes.

*Work as a class. Answer the teacher's questions.*

***15.** *Make a report on bird strike hazard. Use the following words in your report:*

*Bird strike, wild life risk or hazard of bird strike, to ingest, to penetrate, attractive habitats, food, rubbish dump, standing water, swamp, nesting area, migration season, bird scaring.*

***16.** a) Listen to the story; try to catch what kind of damage sustained the plane, what caused the damage.*

*b) Tell the old lady what happened to the bird.*

***17.** Work in pairs. Simulate radio communications in the following situations:*

Пилот сообщает о столкновении с птицами
а) сразу после отрыва;
б) в районе дальнего привода;
в) на участке между третьим и четвертым и информирует диспетчера о том, что треснуло стекло в кабине;
г) в двигатель №1 попала птица, и он заглох;
д) все работает нормально.
Диспетчер уточняет детали.

### *Communication failure*

***18.** Flight ZZZ999 flew a very large portion of the route unaware of communication loss. Read the letter with excuses explaining the circumstances of the event. Guess the meaning of italicized words from the context or ask your teacher to clarify their meaning:*

I have researched the incident concerning ZZZ999 01Nov07 operation.
As to what happened, here is a very short to the point explanation from the pilots:

- San Francisco ARINC reported that an R2 *solar storm* was active for the HF spectrum indicating communications difficulties.
- The Captain and First Officer experienced some problems establishing contact with Arctic Radio prior to reaching DEVID entry point.
- Communications were established with Murmansk on HF.
- Murmansk used SELCAL on two occasions to clarify a position report.
- The Captain *logged on* to Magadan CPDLC as *backup to HF* with Murmansk.

- There was a flight deck crew change over just prior to BESON Compulsory Fix (7921N 10431E) (747-400 has four pilots, of which two fly while two rest. This was the time to *change over* to the rested crew while the Captain and First Officer start their rest period. Prior to this change over there are only two pilots on the flight deck, the other two are in the *bunkroom*.)
- The Captain *briefed* the relief crew that they *were HF* with Murmansk and *CPDLC* with Magadan.
- The relief crew gave a report to Murmansk that they were CPDLC. Murmansk answered "Roger".
- *The relief crew* thought that Murmansk was acknowledging that UAL829 was using CPDLC with Magadan and they continued to send what they believed to be required position reports to Magadan CPDLC.
- When the relief crew requested an altitude change using CPDLC, Magadan *logged* them *off*.
- CHIDD sent an *ACARS* message to contact Bratsk ATC on 133.4. The crew complied and made ATC contact on 133.4.

The relief flight crew misunderstood the controlling ATC unit as being Magadan because they were in contact on CPDLC. In review they wondered why Murmansk had not SELCAL'd them as was done previously. The VHF frequency that the flight was monitoring was 121.5.

In review they also see that they were *confused* by who had control because Magadan was accepting position reports, and therefore they believed that Magadan would *assign* the next ACC to contact.

The incident has *uncovered* a problem in our procedures and the *747-400 fleet* Management is rewriting the Flight Operation Manual *Polar communication* section to provide additional guidance. In addition a Bulletin to all pilots *flying polar* will be issued as soon as possible.
The crew change to the relief crew happened less than 10 minutes from the UYYY FIR and unfortunately the discussion during the hand over to the relief crew included the comments that CPDLC with Magadan was established. The relief crew did not *comprehend* that B480 is not a CPDLC route. They do now.
ZZZ Airlines apologizes to the Russian Air Traffic Service at each ACC between Murmansk and Bratsk. We will do all possible to not have a repeat of this situation.

*Work as a class. Answer the questions.*

***19**. Listen to the story.*
*Work as a class. Discuss the content of the story.*

***20.** Work with a partner. Discuss your actions in case of communication failure. May the controller issue instructions or clearances through 'blind transmission'?*

***21.** Work in pairs. Make short dialogues:*

1) C сообщите пилоту, что его плохо слышно, предложите ему воспользоваться вторым комплектом (box #2).

   P скажите, что сейчас перейдете на второй комплект.

2) P спросите диспетчера можно ли использовать CPDLC на трассе B480.

   C дайте отрицательный ответ.

3) P сообщите диспетчеру, что не можете связаться с Н-ским центром УВД по CPDLC.

C скажите, что Н-ский центр УВД не оборудован CPDLC.

4) C попросите пилота связаться с экипажем BAW 872, потому что он вас не слышит.

P согласитесь, спросите, что передать.
C попросите уточнить номер разрешения на вход в зону.
P свяжитесь с экипажем BAW 872, спросите у них номер разрешения на вход в зону, затем передайте его диспетчеру.

5) P сообщите диспетчеру, что перехватили срочный вызов с борта AFR 342.
C попросите уточнить ситуацию и намерения экипажа AFR 342.

## UNIT 9

### *Unlawful interference and aircraft bomb threat*

***1.*** *Read the text and answer the questions:*

A special emergency is a condition of air piracy, or other hostile act by a person(s) aboard an aircraft, which threatens the safety of the aircraft or its passengers.
The pilot of an aircraft reporting a special emergency condition should:
If circumstances permit, apply *distress* or *urgency* radio-telephony procedures. Include the details of the special emergency.
If circumstances do not permit the use of prescribed *distress* or *urgency* procedures, transmit as many as possible of the following elements spoken distinctly and in the following order:

I. Name of the station addressed (time and circumstances permitting).
II. The identification of the aircraft and present position.
III. The nature of the special emergency condition and pilot intentions (circumstances permitting).

An aircraft equipped with an SSR transponder is expected to operate the transponder on Mode A Code 7500 to indicate specifically that it is the subject of unlawful interference. The aircraft may operate the transponder on Mode A Code 7700 to indicate that it is threatened by grave and imminent danger and requires immediate assistance.

**NOTE-**
Code 7500 will never be assigned by ATC without prior notification from the pilot that the aircraft is being subjected to unlawful interference. The pilot should refuse the assignment of Code 7500 in any other situation and inform the controller accordingly. Code 7500 will trigger the special emergency indicator in all radar ATC facilities.

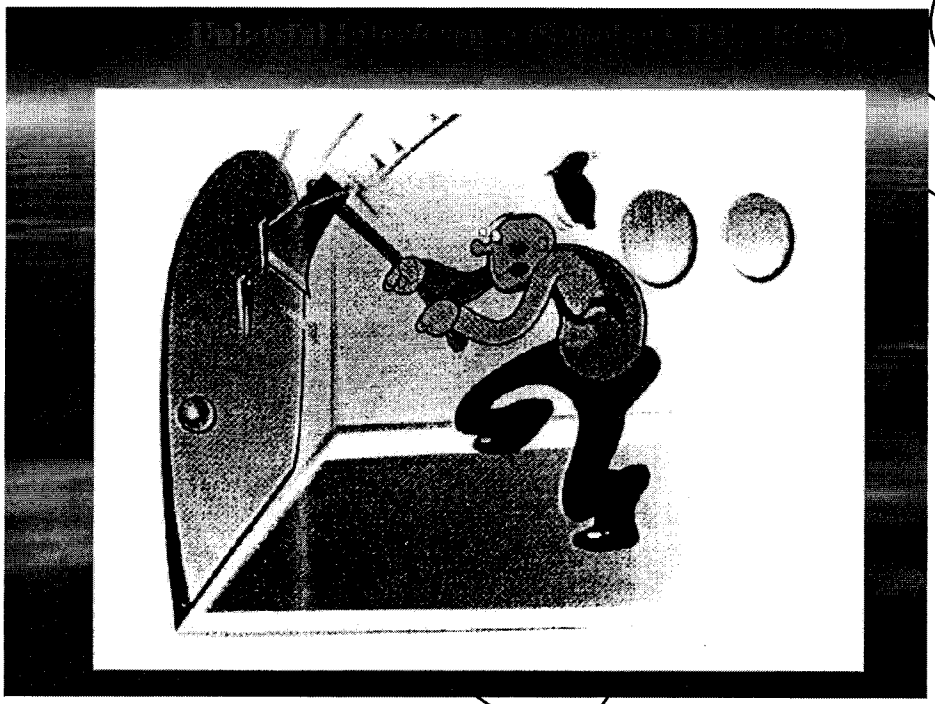
Air traffic controllers will acknowledge and confirm receipt of transponder Code 7500 by asking the pilot to verify it. If the aircraft is not being subjected to unlawful interference, the pilot should respond to the query by broadcasting in the clear that the aircraft is not being subjected to unlawful interference. Upon receipt of this information, the controller will request the pilot to verify the code selection depicted in the code selector windows in the transponder control panel and change the code to the appropriate setting. If the pilot replies in the affirmative or does not reply, the controller will not ask further questions but will flight follow, respond to pilot requests and notify appropriate authorities.
If it is possible to do so without jeopardizing the safety of the flight, the pilot of a hijacked passenger aircraft, after departing from the cleared routing over which the aircraft was operating, will attempt to do one or more of the following things, insofar as circumstances may permit:

I. Maintain a true airspeed of no more than 400 knots, and preferably an altitude of between 10,000 and 25,000 feet.
II. Fly a course toward the destination which the hijacker has announced.

If these procedures result in radio contact or air intercept, the pilot will attempt to comply with any instructions received which may direct the aircraft to an appropriate landing.

*Work as a class. Discuss teacher's questions.*

2. *Look at the picture and tell whether it is easy to penetrate the cockpit. Justify your opinion.*



3. *Work with a partner. Discuss flight crew actions in case of an act of unlawful interference.*

4. *Listen to the stories and answer the questions:*

*A*

1) *What did the Pakistani do before they stormed the plane with hijackers?*
2) *Were the firearms used during the storm?*
3) *What happened to hijackers?*

*B*

4) *A man was arrested at Johannesburg airport. Why?*
5) *What did he threaten to do?*

5. *Listen to the stories and answer the questions.*

A

1) *Was there a real bomb scare?*
2) *What animals are used for bomb searching?*
3) *Are sniffer dogs only trained for explosives searching?*

*B*

1) *Why was the plane shuttled off to a remote stand?*
2) *What means of disembarking were used for evacuation of the passengers?*

C

1) *Why was the North Terminal at San Francisco International Airport evacuated?*
2) *What service is alerted in such situations?*

D

1) *What is done to suspicious packages or unattended baggage found in public places?*
2) *In what cases can we speak about bomb scare? What is a hoax bomb threat?*

***Problems linked to passengers' behavior***

**6.** *Read the text. This is an official document. Try to paraphrase it in a simplified form:*

**Assault and Other Acts of Interference against a Crew Member on Board a Civil Aircraft**

Any person who commits on board a civil aircraft any of the following acts thereby commits an offence:
1) assault, intimidation or threat, whether physical or verbal, against a crew member if such act interferes with the performance of the duties of the crew member or lessens the ability of the crew member to perform those duties;
2) refusal to follow a lawful instruction given by the aircraft commander, or on behalf of the aircraft commander by a crew member, for the purpose of ensuring the safety of the aircraft or of any person or property on board or for the purpose of maintaining good order and discipline on board.

**Assault and Other Acts Endangering Safety or Jeopardizing Good Order and Discipline on Board a Civil Aircraft**

1) Any person who commits on board a civil aircraft an act of physical violence against a person or of sexual assault or child molestation thereby commits an offence.
2) Any person who commits on board a civil aircraft any of the following acts thereby commits an offence if such act is likely to endanger the safety of the aircraft or of any person on board or if such act jeopardizes the good order and discipline on board the aircraft:
a) assault, intimidation or threat, whether physical or verbal, against another person;
b) intentionally causing damage to, or destruction of, property;
c) consuming alcoholic beverages or drugs resulting in intoxication.

**Other Offences Committed on Board a Civil Aircraft**

Any person who commits on board a civil aircraft any of the following acts thereby commits an offence:
1) smoking in a lavatory, or smoking elsewhere in a manner likely to endanger the safety of the aircraft;
2) tampering with a smoke detector or any other safety-related device on board the aircraft;
3) operating a portable electronic device when such act is prohibited.

*Continue the lists:*

1) The following acts aboard a civil aircraft are considered an offence: verbal or physical assault against a crew member...

2) The following actions are prohibited on board a civil aircraft: smoking...

***7.*** *Listen to the stories; answer the teacher's questions and define committed offences.*

*A –*

*B –*

*C –*

*D –*

***8.*** *Read a quotation from a news item. Make assumptions what may have happened before. The teacher will tell you whether you are right or wrong.*

Armed police officers removed a woman from a Cathay Pacific flight. Other passengers clapped when the woman was escorted off the plane.

***9.*** *a) Work in small groups or pairs. Recall similar situations (delays, diversionary landings etc) linked to passengers' behavior (unruly football fans, drunken passengers etc.)*
*b) Share your ideas as a class.*

***10.*** **Read the article:*

**U.S. air marshal kills passenger**

By Brian Knowlton International Herald Tribune
Wednesday, December 7, 2005
Washington

An air marshal on Wednesday shot and killed a passenger who reportedly claimed to have a bomb after an American Airlines jet arrived at Miami International Airport on a flight from Colombia.
It was first known instance of an air marshal firing a gun in the line of duty.
Because the dead man apparently was mentally unstable – and not a terrorist or would-be hijacker – the incident would probably revive debate on the risk of such officers being armed.
Wire service and television reports said that the man, who was identified only as a 44-year-old U.S. citizen, had moved aggressively through the cabin of the airplane – chased by his wife down the aisle – shortly before it landed.
A spokesman for the Homeland Security Department, Brian Doyle, said that the bomb threat came only after Flight 924, a Boeing 757, had pulled up to a gate at the Miami airport.

Confronted by air marshals, who ordered him to drop onto his stomach, the man at first complied.
But he was shot, on the jetway outside the plane, reportedly after allegedly making comments about a bomb and then reaching into his bag – after twice being warned not to, according to CNN. No bomb was found. No one else was hurt. His wife said that her husband suffered from a bipolar mental disorder and had not taken his medication.
The plane was quickly surrounded by police cars and yellow fire trucks. Special trained officers and federal transportation officials were also at the scene. The flight's 100 passengers were detained for questioning. The plane was on route to Orlando, Florida.
The demand last year by Homeland security that flights entering the United States carry armed sky marshals was strongly resisted by pilots unions and some transportation officials in Europe, who said they were worried about the risks of firearms being used in flight. The idea was especially unpopular in Britain. Unions were particularly concerned that undercover marshals could be put on planes without their knowledge.
But the U.S. authorities have given the Europeans no choice but carry armed marshals if they want to fly into U.S. airspace.

*Find the following sentences in the text:*

1) 100 пассажиров этого рейса были задержаны для допроса.
2) Его жена сказала, что ее муж страдал раздвоением личности и не принял лекарство.
3) Столкнувшись с сотрудником Федеральной службы по обеспечению безопасности авиаперелетов, который приказал ему лечь на живот, мужчина сначала подчинился.
4) Самолет быстро окружили полицейские и желтые пожарные машины.
5) Эта идея была особенно непопулярна в Великобритании.
6) Но власти США не оставили европейцам выбора, кроме как брать на борт секретных сотрудников (сопровождающих), если они хотят летать в воздушном пространстве США.
7) Это был первый известный случай, когда сопровождающий воспользовался огнестрельным оружием на службе.

*Answer the teacher's questions.*

***11.*** *Look at the picture. Describe what you see.*

*"Would you like to reconsider your request?"*

*Work with a partner. Discuss the risks of firearms being used in flight. When all groups have finished, share your ideas as a class.*

***12.*** *Listen to the story.*

1) *Describe Vinnie Jones' behavior during his flight from Heathrow to Tokyo.*
2) *What service will you request upon arrival in such a situation?*

***13.*** *Retell the story as if you were the captain (a passenger, cabin attendant) on that Virgin Atlantic flight.*

***14.*** *Work in pairs. Simulate pilot-controller radio communication in the following situations:*

1) Пилот сообщает, что на борту пьяный пассажир оскорбляет бортпроводников. Через некоторое время бортпроводникам и пассажирам удалось его успокоить, применив наручники, но все равно пилот просит полицию после посадки.
2) Один из пассажиров угрожает взорвать самолет, если экипаж не изменит курс.
3) Сначала пилот сообщает, что один из пассажиров заявил, что у него бомба. Через некоторое время пилот сообщает, что террорист обезврежен, самодельная бомба оказалась муляжом (подделкой).
4) Пилот сообщает, что в туалете найден пакет, содержимое похоже на наркотики, запрашивает собаку ищейку по прибытии.
5) Пилот сообщает, что вооруженные люди захватили бортпроводников и пассажиров в заложники. Несколько пассажиров ранены. Террористы требуют следовать в город Н. Похоже, они в наркотическом опьянении.

***Physical description of persons***

***15.*** *Name as many colors as possible. Which of them are often used to describe a) hair? b) eyes? c) both?*

***16.*** *Name the different parts of the face and point to them on your face. (nose, chin, hair, teeth, ear, eye, cheek, mouth, lips)*

***17.*** *Organize the following words into groups*: straight, male, elderly, short, dark, brown, young, pale, grey, blond, tall, curly, fat, female, red, blue, middle-aged, yellowish, in his/her early sixties, black, green, slanting, fair, over forty, bald, slim.

Sex:
Age:
Height:
Build:
Hair:
Eyes:
Skin (complexion):

***18.*** *Match descriptions to the photos:*

1) People from the Northern part of Europe are usually tall with fair hair, blue eyes and a pale complexion.
2) Most people in Mediterranean countries, such as Italy, Spain and Greece, are rather short. They have usually got black or dark brown hair, brown eyes and light brown skin.
3) Most people from Africa have got black curly hair and very dark skin. They have also got dark brown eyes, full lips and a wide, flattish nose.
4) People from Arab countries such as Saudi Arabia, Iraq and Egypt have usually got dark hair and dark brown eyes. They also have dark skin.
5) The Chinese are quite short, with thick black hair and dark, slanting eyes. They have a small nose and a yellowish complexion.

A/

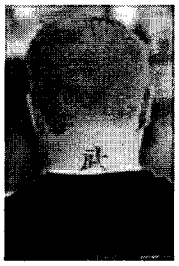
B/

C/

D/

E/

***19.*** *Look at the photos. What can you say about the appearance of these people?*



A

B

C

D

***20.*** *Mystery person (play)*

Customs and immigration service

***Dangerous goods***

***21.*** *Organize the following items into three columns*: knives, perfumes and aerosols, gun powder, hockey sticks, radioactive materials, mobile phones, ammunition; razor blades, fuel, walking cane, screw driver, brass knuckles, baby food, flares, laptop computer, swords, replica firearms, scissors, crutches, matches, axe, a child's carry-cot, hammer, baseball bats, lighters, tear gas, stun gun, pepper spray, hand grenade, liquids, umbrella, toxic substances, flammable solids.

**Prohibited items** **Items allowed into the cabin** **Items subject to special regulation**

*Check your lists as a class.*

***22.*** *Listen to the stories and answer the questions:*

A

1) *What kinds of items were found in the passenger's baggage? Are they allowed to be taken aboard the aircraft?*
2) *Recall as many fire arms as possible. And cold steel?*
3) *Are scissors or a screw driver permitted as carry-on baggage?*

B

*What people usually choose such a way of travelling?*

C

*What part of the plane was chosen for travelling this time?*

D

*Work with a partner. Discuss what hazards await stowaways riding in the wheel well?*

***23.*** *Read the story and answer the teacher's questions:*

***Boy without ticket boards plane during terror alert***

An investigation has been launched after a 12-year-old boy managed to board a plane at Gatwick without any documentation yesterday – despite airport security being on *red-alert* following a *foiled terrorist threat* to *blow* up to 20 UK planes last week.
The boy, who had run away from a care home in Birkenhead, boarded the plane bound for Lisbon at around 6 am.
It was only after *passing airport security*, boarding the plane and being handed a drink and a snack that a member of staff realized he didn't have a passport or boarding pass.
A spokesperson from BAA Gatwick said: "The boy had passed through a full *screening* process and we are confident there was no threat to passengers, staff or the aircraft at any time."
The mother of the boy, who cannot be named because her son is in care, told the News and Star she was stunned that her son had made it onto the plane *undetected.*
The boy has returned to his care home. He had traveled to London on a train *unaccompanied* and without permission, which he has done on a number of occasions. On a previous he got as far as Devon.

***24.*** *Work in pairs. Discuss security measures and limits on the items imposed in your country.*

***Cargo problems***

***25.*** *Match pairs:*

| | |
|---|---|
| a) Dangerous shipment | 1) trucks participating in rally Dakar - Paris |
| b) Perishable shipment | 2) ammunition for army of Brunei |
| c) Valuable shipment | 3) organs for transplant |
| d) Bulky cargo | 4) paper currency |

***26.*** *Listen to the stories and discuss the question: Why the load must be fixed during the flight?*

***27.*** *Look through animals transporting rules.*

A half-million pets fly each year, but not all airlines permit pets to fly in the cabin and other policies vary too.
Some airlines charge to bring pets in the cabin; some don't. Most also don't allow pets to travel as cargo in temperatures below 20 degrees and above 85 degrees.
Most airlines require pets to be considered healthy, less than 100 pounds and at least 8 weeks old.
Pets are never allowed out of their containers, and, of course, the airline assumes no responsibility for their health and well being.
Less traditional pets aren't allowed at all, like potbellied pigs, primates and venomous reptiles.
A note should be taped on the pet container with all relevant information: name of the pet, age, destination and flight number.
The pet must be wearing tags or be micro chipped.

- *What rules of transporting animals do your aviation authorities impose?*
- *Work with a partner.*
  *Your wife (husband, girlfriend etc.) is going to Paris next month. He/she wants to take his/her lap dog with her. Give him/her advice on what he/she should do.*

***28.*** *Listen to the stories and after listening simulate pilot – controller dialogues in similar situations.*

***29.*** *Chain story.*

Several years ago, as I was flying Boeing 737 from XXXX to ZZZZ after forty minutes into the flight the purser entered the cockpit and told us that a passenger had spotted a rat in the aisle.

*Continue the story.*

***30.*** *Work in pairs. Simulate pilot-controller dialogues in the following situations:*

1) При раздаче напитков бортпроводники обнаруживают безбилетного пассажира. У него нет посадочного талона и никаких документов.
2) Пилот сообщает диспетчеру, что на борту находится ценный груз и просит обеспечить к их прибытию машину с охраной (security van).
3) Пилот сообщает, что у него на борту почка для пересадки, и просит дать скорее разрешение на вылет.
4) Пилот сообщает, что у него на борту несколько собак, которых везут с международной выставки собак. Одна из них, довольно крупной породы (large breed) вылезла из клетки, ведет себя агрессивно. Пилот просит к прибытию ветеринара или кинолога (dog trainer).

***31.*** *Read the text. Learn the new vocabulary.*

## *Safety Assessment of Foreign Aircraft (SAFA) Program*

The principles of the Program are simple: in each ECAC State, foreign aircraft (ECAC or non-ECAC) can be subject to a ramp inspection, chiefly concerned with the aircraft documents and manuals, flight crew licenses, the apparent condition of the aircraft and the presence and condition of mandatory cabin safety equipment. The references for these inspections are contained in the Standards of ICAO Annexes 1 (Personnel Licensing), 6 (Operations of Aircraft) and 8 (Airworthiness of Aircraft).

The inspection checklist consists of four major parts. Part A concerns items to be inspected in the flight deck of the aircraft. Part B of the checklist concerns items to be checked in the (passenger) cabin, and mainly consists of safety equipment. Part C relates to the general technical condition of the aircraft which needs to be verified during a walk around check. Part D checklist items concern the cargo compartment of the aircraft and the cargo carried.

**A**

The Minimum Equipment List (MEL) specifies the circumstances under which an aircraft may be operated in spite of certain equipment being inoperative. The MEL is established by the aircraft operator and approved by the responsible State of Operator. The majority of the findings concern the lack of evidence of approval of the MEL, the MEL not being carried onboard or being out of date. Also in many cases instead of the MEL the MMEL (Master MEL) is being used. The MMEL is established by the aircraft manufacturer as a baseline document for the operator to establish the MEL.

The Flight Operations Manual (FOM) provides flight procedures for the flight crew. Frequent findings are: no approval by the State of Operator, content of the manual does not meet the ICAO Standards, the manual is not up-to-date or has been drafted by another airline.

ICAO Annex 6 requires that flights shall be performed only when the standards relating to operational flight planning have been complied with. The majority of the findings concern incorrect Operational Flight Plans, incorrect fuel calculation and/or monitoring, incomplete relevant information (meteorological, NOTAMs).

**B**

The findings mainly concern emergency exit lights which are not functioning properly, torches (flashlights) which are not available, in poor condition or not available in sufficient quantity, and non-installation or inadequately functioning of floor proximity (emergency) escape path marking systems. These systems indicate the location of the emergency exits. They are important especially when there is a fire or smoke in the passenger cabin or when the normal cabin lights are not functioning. Example of this last non-compliance is situations whereby sections of the escape path marking, covering several seat rows, were out of order.

Access to emergency exits must always be clear of obstacles. In case of an emergency, the path to the emergency exits and doors should be clear, allowing a rapid evacuation of the aircraft. Findings established are obstruction of access by catering boxes, luggage and cargo. Another frequent finding, especially on CIS-built aircraft, is the fact that the seats in front of the emergency exits can fold forward and in case of an emergency may block the path to the exit. Also in many cases the locks of the tray tables on the seats in the area of emergency exits do not prevent the tray tables from obstructing an unrestricted access to the exits.

The cabin crew members have to be able to perform their normal and abnormal duties without hindrance. The findings mainly reveal the poor condition of the cabin, loose carpeting impeding the crew to perform their duties, improper stowed luggage.

**C**

Checking the general external condition means checking for apparent corrosion; cleanliness; presence of ice, snow, frost; legibility of markings, windshield delamination, damages, exterior lights etc. The majority of the findings concern paint damage, illegible or missing markings, inoperational lighting, missing or loose screws.

Wheels, tyres and brakes need to be in proper condition. Reported findings are tyres worn beyond limits, cuts in the tyre, leakage of hydraulic fluid in landing gear areas, brakes worn beyond limits.

The engine, the engine housing, the pylon (attachment of the engine to the wing or aircraft structure) and the access panels in the engine housing and pylon are carefully inspected. Findings relate to fuel and oil leakages, missing rivets in engine housing and damage of acoustic panels in the engine intake area.

**D**

In several cases ramp inspections established that cargo in the cargo holds was not properly secured. Heavy items (such as spare wheels) were not restrained, which might lead to damage of the aircraft in case of rapid acceleration / deceleration. In other cases, barrier nets were either not installed or in poor condition. Cargo containers and pallets were in poor condition. Locks to secure the containers were not in the proper position or unserviceable.

Certain types of material need special care and treatment because they are flammable, toxic, poisonous, etc. These are commonly referred to as "Dangerous Goods". When properly packed, stored, labelled, protected etc., Dangerous Goods may be transported. Findings that have been recorded included improper storage and labelling of the Dangerous Goods carried onboard, unavailability of the required documents and manuals (Emergency Response Guide), missing authorisation for the transportation of Dangerous Goods and no proper notification to the Captain (NOTOC) of Dangerous Goods carried onboard.

Findings related to the general condition of the cargo compartment, such as damage to panels, deficiencies with the locking system, improper repairs of panels, and missing separation nets. Based on the category, number and nature of the findings, several actions may be taken.

If the findings indicate that the safety of the aircraft and its occupants is impaired, corrective actions will be required. Normally the aircraft captain will be asked to address the serious deficiencies which are brought to his attention. In rare cases, where inspectors have reason to believe that the aircraft captain does not intend to take the necessary measures on the deficiencies reported to him, they will formally ground the aircraft. The formal act of grounding by the State of Inspection means that the aircraft is banned from further flights until appropriate corrective measures are taken.

**32**. *True or False*?

A. The seats in front of the emergency exits may block the path to the exit. ( )
B. The MMEL is established by the aircraft manufacturer as a baseline document.( )
C. Heavy items in the cargo holds should be restrained. ( )
D. Checking the general internal condition means checking for presence of ice, snow, frost; legibility of markings, windshield delamination, etc. ( )
E. The formal act of grounding by the State of Inspection means that the airline is banned from further flights to Europe. ( )
F. Missing authorization for the transportation of Dangerous Goods is a common finding. ( )
G. Ramp inspectors cannot ground an aircraft. ( )
H. The cabin crew members have to be able to perform their normal and abnormal duties without hindrance. ( )
I. The locking system indicates the location of the emergency exits. ( )

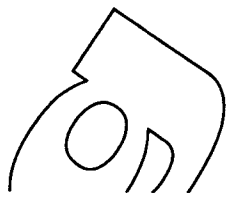
J. Certain types of material cannot be transported by aircraft because they are flammable, toxic, poisonous, etc. ( )

***33.*** *Fill in the gaps.*

| | |
|---|---|
| A. The crew decided to descend to 10,000 ft because of windscreen _____. | 1) hindrance |
| B. Cargo containers and pallets were in poor _____. | 2) deficiencies |
| C. The cabin crew members have to be able to perform their normal and abnormal duties without _____. | condition<br>3) legibility<br>4) markings<br>5) finding<br>6) delamination |
| D. Checking the general external condition means checking for apparent _____; presence of ice, snow, frost; _____of markings. | 7) corrosion<br>8) attention<br>9) actions |
| E. Normally the aircraft captain will be asked to address the serious _____ which are brought to his _____. | 10) rivets<br>11) damage |
| F. Improper operation of the locks of the tray tables is another frequent _____ . | |
| G. There should be no missing _____ in engine housing. | |
| H. Based on the category, number and nature of the findings, several _____ may be taken. | |
| I. The majority of the findings concern paint _____, illegible or missing _____. | |

***34.*** *Work in pairs. Student A is a SAFA inspector. Student B is a captain. Discuss items to be checked in parts A, B, C, and D of the text above.*

## UNIT 10



### *Parts of the human body*
### *Internal organs*

1. *Play "Body Stretcher".*

2. *What is it?*

3. *What organs have been named? What other internal organs do you know?)*

4. *Cross out misfits:*

| | | | |
|---|---|---|---|
| *Hand* | *wrist* | *ankle* | *arm* |
| *Eyes* | *nose* | *finger* | *ear* |
| *Lungs* | *brain* | *stomach* | *kidney* |
| *Spine* | *jaw* | *ribs* | *chest* |

### *Medical specialists*
### *Symptoms, injuries and wounds*

5. *Match medical specialists and what they do:*

a) *Cardiologist* *1)* treats women during pregnancy and childbirth

b) *Therapist* *2)* treats diseases and disorders of the nervous system.

c) *Nephrologist* *3)* manages a woman's health care, especially during pregnancy, delivery

d) *Neurologist* *4)* treats eye defects, injuries, and diseases.

e) *Psychiatrist* *5)* surgically treats diseases and injuries.

f) *Surgeon* *6)* treats heart disease.

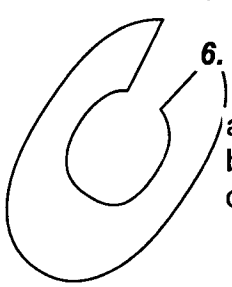
g) *Forensic medicine* *7)* treats kidney diseases.

h) *Obstetrician* *8)* treats patients with mental and emotional disorders.

i) *Pediatrician* *9)* treats diseases and disorders of internal structures of the body.

*j) Ophthalmologist* *10)* treats infants, children and teenagers.

*k) Midwife* *11)* the applied use of medical knowledge to the purposes of the law, as in determining the cause of death.



6. *Match definitions with appropriate words:*

| | |
|---|---|
| a) A person who checks your eyes | 1) dentist |
| b) A doctor who performs operations | 2) obstetrician |
| c) An emergency medical vehicle | 3) pediatrician |

d) A heart specialist
e) A doctor who specializes in children
f) Conditions of an illness
g) A doctor who specializes in mental illnesses
h) A doctor who delivers babies
i) A doctor who takes care of people's teeth

4) ophthalmologist
5) psychiatrist
6) surgeon
7) cardiologist
8) ambulance
9) symptoms

Sometimes it may be difficult to determine the type of medical specialist needed to diagnose and treat a particular problem. The first task in treating an illness is to determine the symptoms of the ailment. When you know the symptoms, you may then refer to a medical specialist who deals with the specific area of medicine.

**7.** *Work with a partner. See the symptoms listed below. Explain the kind of doctor you'll visit and why.*

*If you can't guess the meaning of unknown words, look for their meaning in the dictionary:*

Fever; blurred or double vision; headache; runny or stuffy nose; difficulty swallowing; sore throat; chest pain; wheezing; breathing problem; cough; stomach trouble; nausea and vomiting; diarrhea; abdominal pain; back pain; rash and itching; cuts, bruises and scrapes; bleeding wound; fracture; burns; choking; twist; frost bite; brain concussion; contractions.

**8.** *Match the synonyms:*

a) Illness
b) Laceration
c) Eye doctor
d) Pass out
e) Broken bone
f) Injury
g) Cardiologist
h) Psychiatrist
i) Baby doctor
j) ENT doctor

1) trauma
2) heart doctor
3) pediatrician
4) ailment
5) brain shrink
6) otolaryngologist
7) cut
8) oculist
9) fracture
10) to lose conciseness

***Infectious diseases***
***Quarantine***

**9.** *Read the article. Underline all mentioned infectious diseases.*

***Bird flu worry: Spreading deadly disease at jet speed***

WASHINGTON
Planes provide the quickest way to get from one part of the world to another — for deadly contagious diseases as well as for people.

In the spring of 2003, the respiratory virus SARS journeyed to five countries in 24 hours after emerging in rural China. Airline and tourism industries lost billions of dollars worldwide because people were afraid to travel and governments ordered flights canceled.

With concerns about bird flu rising, U.S. health and aviation officials are taking steps to guard against a repeat.

More quarantine stations have been set up at airports. A better system is in place for tracking travelers who might have been exposed. Flight crews have instructions to report sick passengers.

Bird flu generally spreads to people through contact with bird excretions. The fear, though, is that it will mutate into a disease that spreads from human to human.

The disease is most prevalent in Southeast Asia, to which only two U.S. airlines fly their own planes — United and Northwest. But officials with the Centers for Disease Control and Prevention, airlines and U.S. aviation officials are keeping a close eye as the disease spreads elsewhere.

Airports should be prepared to make space available and tell staff and police that planes will need to be isolated and passengers quarantined.

Planes provide a good environment for spreading disease. Passengers are in close quarters and confined for hours, and multiple people may sit in the same seat between cleanings as the jet makes different stops.

Airlines also follow CDC guidelines calling for flight crew to separate a passenger with a contagious disease, if possible, and provide a surgical mask. Pilots, by law, must notify the nearest quarantine station and quarantine workers will arrange for medical assistance, notify health departments.

An Orlando, company called AeroClave has developed equipment that modifies temperature and humidity inside airplanes so the air kills smallpox, SARS and bird flu. A giant white box and hose pump heated air through an airplane's ventilation system for two hours, disinfecting parts of the plane that cleaning crews can't reach.

Since the SARS outbreak in 2003, the CDC has added nine more quarantine stations to international airports for a total of 17. CDC workers can meet airplanes from countries affected by a disease and isolate anyone who shows symptoms.

Flight crews were reminded that they must notify health officials if a passenger shows suspicious symptoms. The airlines have annual training for flight attendants on controlling infectious diseases and an airline doctor available around the clock.

- *Work as a class. Answer the teacher's questions.*

**10.** *Fill the gaps using the words below:*

Rome-Fiumicino international airport has begun _____ measures for passengers and merchandise from regions affected by _____ ____. The airport said passengers _____ from China or Russia might be hospitalized if they showed

signs of _____ problems and all "poultry-based food" from _____ areas would be destroyed.

*(arriving, respiratory, precautionary, affected, bird flu)*
*Work with a partner. Discuss what precautionary measures were taken at Rome-Fiumicino airport? Why?*
*Share your ideas as a class.*

***11.*** *Listen to the story.*

- *Continue the sentences:*

1) Danish airport authorities imposed...
2) The captain informed the controller that a female passenger ...
3) On landing, the plane was escorted...
4) It proved to be a false ...
5) The woman suffered...

- *Retell the story. One student starts, the others continue.*

***12.*** *Work in groups. Role play a similar situation.*

***13.*** *Read the story and answer the teacher's questions:*

***Heathrow doctor 'terrified plane passengers with protective clothing'***

A doctor terrified passengers on a packed plane at Heathrow Airport when he boarded wearing a full protection suit and goggles to treat a man for a cough, a disciplinary panel heard yesterday. The 'irresponsible' actions of doctor Egidius Panis, at the height of the SARS scare, were totally unnecessary and would have caused 'alarm and fear' to the passengers and patient, the General Medical Council hearing was told.

The Dutch doctor, whose job at Heathrow was to screen immigrants for infectious diseases, is also said to have carried out an 'inappropriate' breast examination on a young student while checking her for tuberculosis.

Dr Panis is further accused of forging his manager's signature on reports and trying to bully two of his bosses after they asked for explanations for his eccentric behavior. In a series of 'bizarre' emails and letters, he said one had lost his memory and accused the other of stalking him, the hearing was told.

Dr Panis of Barming, near Maidstone in Kent, who moved to the UK in 1991, faces being struck off the medical register if the allegations of serious professional misconduct are proved. The hearing continues.

***14.*** *Imagine a similar situation. You advise the controller that you have a passenger on board that shows some symptoms of SARS. After landing your aircraft is shuttled off to a remote stand and you are waiting for medical staff to screen the passengers. Describe your feelings when you see a doctor* 'wearing a full protection suit and goggles'.

**15.** *Do you have any medical personnel at your base airport whose responsibility is to impose quarantine and to screen passengers for infectious diseases? Discuss the procedure with a partner and then share your ideas as a class.*

**16.** *Listen to the stories and match medical problems with the stories. Mark the stories with letters 'A', 'B' and 'C'.*

1) passengers' complaints of watery eyes and Itchy throats;
2) a female passenger with heart attack;
3) the pilot suffered facial cuts and smoke inhalation;

*Retell the stories using the prompts written above.*

**17.** *Listen to the story twice. First listen for the gist, while listening once again fill in the table:*

| | |
|---|---|
| Aircraft type | |
| Operating company | |
| Departure aerodrome | |
| Destination | |
| Total number on board | |
| Flight phase | |
| Nature of emergency | |
| Injuries | |

*Retell the story. Do not forget to speak on the kinds of injuries received by the cabin crew.*

**18.** *Read the story and answer the questions:*

1) What equipment caused passenger's injury?
2) How did it happen?

A Japan Airlines Boeing 747-400, registration JA8919 performing flight JL-61 from Los Angeles, (USA) to Tokyo Narita (Japan) with 215 passengers, was about 3 minutes into the flight on Feb 11th, when a in flight service trolley weighing about 60kg (132 lbs) departed its rack in the center galley and impacted the rear rack of the galley. No injuries occurred; the aircraft continued its journey to Tokyo. The airline did not report the incident to authorities as there were no injuries, however when Japanese authorities got aware of the incident, they demanded a full report from the airline.

Preliminary findings suggest, that two flight attendants failed to verify, that the trolleys were secured. Regulations require that the lock of the trolleys is to be verified by one flight attendant and cross checked by another.

Authorities also said, that there had been a similar accident on November 3rd 2007,

when a trolley on board of a Skymark Airlines Boeing 767-300 registration JA767D went loose during the landing roll and collided with a passenger, who suffered a fractured foot.

**19.** *Read the story:*

***Flatulence prompts jet to make emergency landing***

December 7, 2006 - 11:40AM
The Sydney Morning Herald

An American Airlines flight made an emergency landing on Monday after a passenger with severe gas problems struck matches to mask the odour of flatulence, an official said.
The flight from Washington to Texas landed at Nashville airport, in the south-eastern state of Tennessee, after passengers alerted the crew about the smell of burning sulfur, Lynne Lowrance, spokeswoman for the Nashville International Airport Authority said. She said all 99 passengers and their luggage were taken off the plane and searched, and an unlucky canine team was brought in to sniff the aircraft for explosives. After intense questioning by the FBI, a woman passenger admitted to lighting matches on board the aircraft to conceal her gas, Lowrance said.

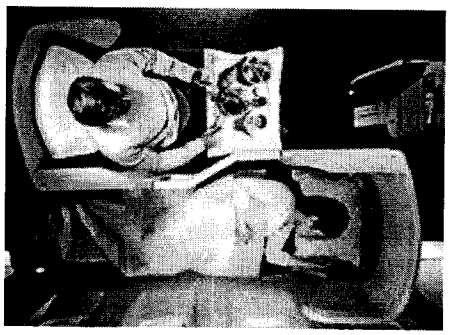
"For a long time she did not admit to striking matches and I think that was just out of embarrassment," she said. "She did finally admit to it saying she had a medical problem about excessive gas."The unidentified woman was not charged but "American did ban her from flying on their airline for a very long time," Lowrance said.

- *Work with a partner. Discuss the cause of emergency landing.*
- *Retell the story as if you were the captain on that flight. Describe the captain's feelings when he was told about the real reason for the emergency landing.*

**20.** **Read the article and answer the question: What dilemma did the crew face in that quite uneasy situation?*

**BA passengers share first class cabin with dead traveler**

by RAY MASSEY 5th December 2006
First Class travelers on a British Airways transatlantic flight were horrified when they were forced to sit next to a dead body for three hours. The elderly passenger had died of a heart attack just minutes earlier and was carried into their cabin to continue the journey to America.
It followed a mid air drama in which a doctor and crew lost a 35 minute battle to resuscitate the man after he suffered a cardiac arrest in business class where he was travelling with his wife.



Four stewards and a fellow passenger then struggled to carry the deceased American in his seventies into their exclusive area - where tickets cost up to £6,669 return.

The tragedy happened on BA Boeing 777 Flight 213 which left Heathrow for Boston at 10.30am carrying more than 200 passengers but details have just emerged. The deceased American had been travelling with his wife in the Club Word business class section when he suffered his heart attack about three hours into the six hour flight. The crew made an announcement calling for a medical doctor, and the stricken passenger taken into the galley area between business and first class where attempts were made to resuscitate him. But after more than half an hour he was declared dead. The tragic case highlights the dilemma facing crews on a packed long-distance plane of what to do with a dead passenger - while balancing the dignity of the deceased with the distress of their family and the concerns of other often squeamish passengers. One First Class cabin eyewitness - a senior computer executive in her 30s - said: 'It was a very strange and unsettling thing to experience. 'We were about half way into the flight and getting my head down to sleep when I heard a commotion from behind the curtain in first class. 'Stewardesses were running up and down the aisle. There was no panic but there was a sense of urgency. The staff were very professional. 'There was a call over the loudspeakers for a medical doctor. From where I was sitting towards the back of First Class I was aware of them performing resuscitation techniques behind the curtains as I tried to watch the in-flight movie - Mission Impossible III.' 'I felt quite uneasy. But some passengers were being very British about it and simply not acknowledging there was anything wrong.

'It's not very enjoyable when this happens. But the staff were very good.' A spokesman for British Airways confirmed: 'Sadly, an elderly male passenger died on board BA flight 213 from Heathrow to Boston on Tuesday November 28. 'Our cabin crew and a doctor who was on board the flight did absolutely all they could to save the man and treated him for more than 35 minutes with coronary pulmonary resuscitation (CPR). But unfortunately he passed away.' The BA spokesman added: 'Our thoughts and condolences are with the passengers, family and friends - especially his wife - who was travelling with him.' BA said the dead man was taken into First Class because business class was full. The airline said there were about a dozen deaths aboard its planes each year - out of a total of 36 million passengers.

*Discuss with a partner your possible actions in a similar situation.*

***21.** Listen to the story and answer the questions.*

1) What happened on board the aircraft?
2) Was there anybody to help the woman?

3) What was the sex of the newborn child?
4) What was the mother's nationality?
5) Did the crew continue the flight to their destination after baby had been born?
6) Have you ever experienced similar problems?

Some airlines impose restrictions on travelling of pregnant women, such as: pregnant women who expect to give birth within four weeks of the date of travel are required to have their doctor's written consent for the flight.

*Work with a partner. Discuss restrictions on travelling of heavily pregnant women and newborn children imposed by your airline (national carrier)?*

*(P) Retell the story as if you were a pilot of that flight. Evaluate the risks that a heavily pregnant woman takes when she travels by plane.*

*(C) Retell the story as a controller guiding that flight. Evaluate the risks that a heavily pregnant woman takes when she travels by plane.*

***22.*** *(P) The cabin crew are usually trained to give first aid. Of course there is a first aid kit aboard every plane, but sometimes assistance of a specialist is needed. Make an announcement through the public address system and call for a doctor. The announcement should be of*

*a) a passenger with suspected heart attack;*
*b) a woman in labor;*
*c) a choking child;*
*d) an elderly woman passed out;*
*e) a passenger suffering from stomach pain.*

***23.*** *Read the story and answer the teacher's questions:*

NEW YORK - A man who tried to send his late wife's body to their native Ecuador for burial is suing American Airlines and a funeral home, claiming the carrier misplaced his wife's remains for four days.
Miguel Olaya, 60, says he hired the DeRiso Funeral Home in Brooklyn to ship his wife's body to Guayaquil, Ecuador, on April 1, but the coffin was not aboard the plane when he went to meet it at the airport.
Christopher Robles, Olaya's lawyer, said the airline initially gave his client conflicting stories.
"First they didn't know where her body was. Then they said maybe it was in Miami and finally they said it was in Guatemala," the lawyer said Tuesday. "Instead of sending it on the flight to Guayaquil, American sent the body to Guatemala City."
The lawyer said Olaya could not collect his wife's remains until April 4. "The body was missing for four days," he said.
Funeral director Kathleen DeRiso said the shipping error was caused by someone at American who punched in the wrong airport code. She said they wrote GUA for Guatemala instead of GYE for Guayaquil.
American spokeswoman Jennifer Pemberton said her company was investigating the situation but could not comment because of the pending litigation.
Olaya's wife, Teresa, died of cancer at age 57 on March 28.

***24.*** *Work in pairs. Simulate radio exchange in the following situations:*

1. На борту больной пассажир с симптомами «птичьего гриппа»: кашлем, ознобом и температурой выше 37.5;

2. У пассажира на борту сердечный приступ, пилот запрашивает посадку на ближайшем аэродроме и медицинскую помощь по прибытии.
3. На борту пассажир с ограниченными возможностями, экипаж запрашивает по прибытии специальное оборудование (инвалидное кресло).
4. В салоне первого класса странный запах, пассажиры жалуются на першение в горле и слезящиеся глаза, несколько человек потеряли сознание, экипаж просит немедленную посадку.
5. У пассажира боли в животе, пилот просит немедленную посадку, скорую помощь и переводчика с испанского, так как пассажир не говорит по-английски.
6. На борту буйный пассажир, бегает по проходу, пытается открыть аварийный выход. Сопровождающая его жена говорит, что ее муж психически нездоров и что он забыл принять лекарство перед полетом. Экипаж просит специализированную (психиатрическую) скорую помощь по прибытии.
7. На борту женщина с большим сроком беременности, у нее начинаются схватки. Командир говорит диспетчеру об этом, а через некоторое время сообщает, что на борту родился ребенок, и просит внеочередную посадку.
8. Самолет попал в сильную болтанку, несколько пассажиров получили сильные ушибы, а у одного ребенка, похоже, перелом руки.

***Pilot's temporary disability***

***25.*** *Read the story and answer the questions:*

**Crew incapacitation**

The pilot of a jet carrying 177 passengers was suffering from anxiety and stress when he was restrained from flying his plane as it landed at Melbourne Airport last year. The captain of the Qantas Boeing 767-300 aircraft reported feeling unwell soon after take-off from Auckland, New Zealand, on May 12. An Australian Transport Safety Bureau report on the incident says the captain left the flight deck and was given oxygen after telling cabin crew he felt nauseous and shaky.

The co-pilot took control of the jet over the Tasman Sea and alerted air traffic control and organised for an ambulance to meet the plane on landing in Melbourne. A flight attendant was posted inside the cockpit to monitor the condition of the co-pilot. Before the plane landed, the pilot returned to the cockpit. The report says: "His seat, seatbelt and harness were adjusted so that he could not inadvertently interfere with the operation of the aircraft."

The plane landed safely. The pilot was treated by paramedics at the airport and admitted to hospital.

The pilot told investigators he had been suffering anxiety problems for several years, but they were not related to his work.

The pilot was taking anti-depressants for his condition and was also undergoing treatment for hypertension.

He also reported sleeping poorly the night before the flight and suffering from a sinus infection.

The investigation found the pilot's anxiety may be have risen from low blood pressure because of his medication, fatigue and a head cold.

The Civil Aviation Safety Authority was aware of the pilot's condition before the flight and his ability to fly was constantly monitored.

Qantas would not comment on the incident.

*Work as a class. Discuss problems linked to flight crew incapacitation and causes of pilot's temporary disability.*

**26.** *What else can cause pilot's temporary disability?*

*Read the story:*

***WOMAN PILOT SUSPENDED AFTER DRUNK ALLEGATION***

(12/01/2005)
A British woman pilot has been suspended for allegedly drunk as she was about to fly a plane.
The easyJet captain was due to fly from Berlin, Germany, to Basle, in Switzerland, on Saturday when she was stopped by police officers and breath-tested.
The 120 passengers had not yet boarded the Airbus 319 flight at Berlin's Schoenefeld Airport, which was due to take off at 6.45am.
It was reported that the woman, who has not been named but who was reportedly earning £70,000-a-year, was stopped after a tip-off.
An investigation is now under way.
Under the Civil Aviation Authority's rules, pilots are banned from drinking for eight hours before a shift. EasyJet said its own rules imposed a 10-hour embargo on alcohol ahead of duty required "moderation" – defined as a maximum of up to five glasses of wine – over preceding 24 hours. The aircraft, an Airbus A319, left 20 minutes late under the command of a back-up pilot.
Pilot's unions say alcohol abuse among cockpit crew is highly unusual. However, a series of recent cases has damaged the reputation of the profession. Last month, the British pilot of a Royal Brunei Airlines jet was jailed for eight months for failing a breath test at Heathrow. A week earlier, a 51-year-old Finnair pilot was given a six-month sentence after reporting for duty at Manchester after drinking six glasses of wine and a beer the previous day.

*Answer the teacher's questions.*

**27.** *Work as a class. Discuss alcohol abuse among aviation specialists.*

**28.** *Work in pairs. Simulate radio exchange in the following situations:*

1) Второй пилот докладывает диспетчеру, что командир потерял сознание, похоже на сердечный приступ, просит немедленную посадку.