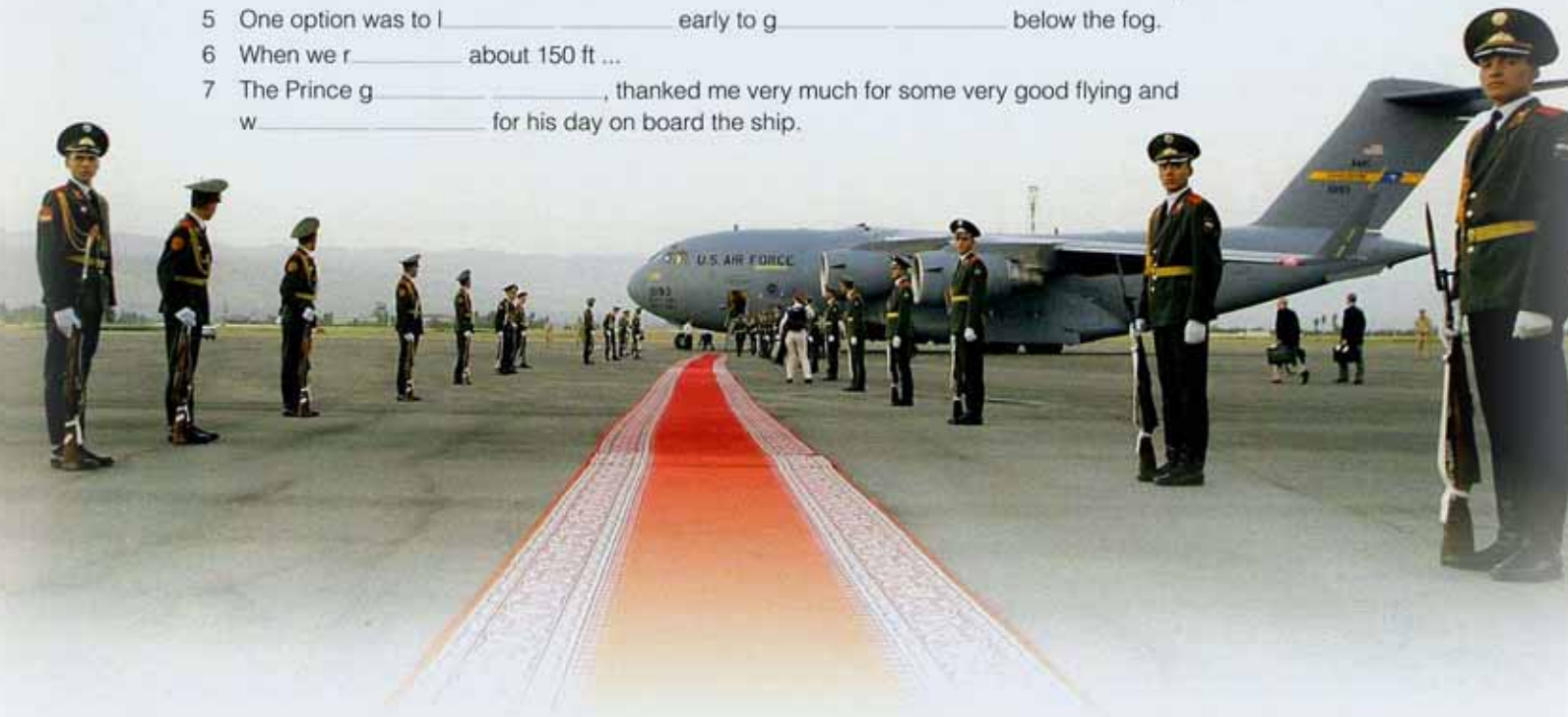




Vocabulary – Verbs of movement

- 17 Work in pairs. Try to complete the sentences from the description of the VIP's journey with a suitable verb, then listen again and check.

- 1 We were asked to p_____ a VIP ... and t_____ him to a Royal Navy ship for the day.
- 2 There were clear blue skies when we l_____.
- 3 We l_____ by the house, shut down and g_____.
- 4 While we waited for them to clear us to c_____, I spoke to the prince.
- 5 One option was to l_____ early to g_____ below the fog.
- 6 When we r_____ about 150 ft ...
- 7 The Prince g_____, thanked me very much for some very good flying and w_____ for his day on board the ship.



Pronunciation – Consonant clusters 2

- 1 18 In unit 6 we looked at consonant clusters at the beginning of words. These can also occur in the middle or at the end of words. Listen and repeat these words from the description of the VIP's journey.

aircraft
asked
safety
options
explained
thick white fog
the ship's radar
some very good flying

- 2 Work in pairs. Take turns to pronounce the following words clearly. Listen to your partner's pronunciation and tell them if it is not clear.

reverse thrust
available slots
thick smoke
climb vertically
dump fuel
damaged struts

- 3 19 Listen and repeat the words.

Speaking

Work in small groups. Discuss the statements below. Do you agree or disagree with the statements? Why / Why not?

- 1 You should be more careful when you carry VIP passengers.
- 2 Airline companies should offer VIPs a special service.
- 3 VIPs and ordinary passengers should not mix on planes.
- 4 ATC should provide extra separation for aircraft carrying VIPs.
- 5 Members of the government or royalty should only travel on military aircraft.
- 6 VIPs create too much work for pilots and ATCs.



Section three – Undercarriage

- 1 Work in small groups. Each member of the group choose a different picture and study it for one minute. Close your books and then try to describe your picture. Time each person's description. Who produced the longest stretch of language at an appropriate tempo?



- 2 Listen to three dialogues between pilots and tower controllers. Choose the best picture (a–d) for each dialogue.

20,21 1 _____ 22 2 _____ 23,24 3 _____

- 3 Listen to the three dialogues again and underline the correct information.

20,21

- 1 Macair 319 *has / doesn't have* a green light for the nose gear.
2 After making a low pass, Macair 319 wants to *fly east / orbit* the aerodrome.

22

- 3 A30 is *arriving / departing* traffic.
4 A30 is going to *return immediately / try and solve the problem*.

23,24

- 5 S62 has *little / a lot of* fuel remaining.
6 S62 is *behind / in front of* Fastair 350.

Functional English – Resolving misunderstanding

- 1 Listen again and complete the dialogues.

1 21

Pilot I'm sorry. The nose wheel is in position? (1) _____ ? Macair 319.
Controller Macair 319. Negative, (2) _____. The nose wheel appears down but it's at a 90° angle.
Pilot (3) _____ the nose gear is down but stuck at 90°. Macair 319.
Controller Macair 319. (4) _____.

2 22

Controller A30. It appears your main gear hasn't retracted.
Pilot Roger, my main gear has retracted. Thank you sir. A30.
Controller A30. (5) Negative. _____. Your main gear is not retracted. It is still visible.
Pilot OK. Our main gear is stuck ... er... OK A30.

3 24

Pilot Tower, this is Fastair 350 on three-mile final. The apron is to the right of runway 34R.
(6) _____ 34L for the belly-landing for traffic behind me?
Controller Fastair 350. Affirm. Thank you.



- 2 The phrases on the left can be used to check understanding. Match them to the functions on the right. Some of the functions can be used more than once.

- | | |
|------------------------------|--|
| 1 That's right. | a repeating |
| 2 Say again. | b checking understanding / querying |
| 3 That's incorrect. | c confirming correct understanding |
| 4 Understand that ... | d stating understanding |
| 5 Is that correct? | e asking for repetition |
| 6 I say again ... | f saying someone hasn't understood correctly |
| 7 That's wrong. | |
| 8 You haven't understood ... | |
| 9 Do you mean ... ? | |
| 10 Please read back in full. | |

- 3 Work in groups of three. You have reports of three incidents with arriving and departing aircraft. Some of your information in each report is incorrect. If two people have the same information, it is correct. Use the phrases from 2 to resolve any misunderstandings.

Student A read out report A below. Student B go to p 110 and read out report B. Student C go to p 112 and read out report C.

Student A

- A Flight SQ286 taxied to runway 05L at Sydney's International Airport and was cleared for take-off. When the captain rotated the B747-412 for lift-off, the tail struck the runway and scraped for 490 m until the aeroplane became airborne. The tail strike occurred because the rotation speed was 35 kt less than the 163 kt required for the aeroplane weight.
- B The controller cleared Flight 504 for a visual approach to runway 15. At 09:54 the crew reported on finals and were cleared to land. The Cessna Citation touched down 45 m short of runway 15 and struck the edge of the runway threshold. It continued for 112 m before coming off the runway. It ran another 263 m before it skidded into the wall of a building and stopped.
- C Flight 1455, a B737-300, was vectored for a visual approach to runway 8. The flight's descent angle was more than 6°. Touchdown speed was 182 kt. The crew couldn't stop the aircraft on the runway and it overran. It crashed through the perimeter fence at a speed of 32 kt and stopped in a lake. The forward service-door escape slide inflated inside the plane and the nose gear collapsed.

Speaking

Discuss the questions in pairs.

- 1 When was the last time you had to resolve a misunderstanding at work? What exactly happened?
- 2 Have you ever been in a situation where either:
 - a it was impossible to understand someone else?
 - b someone found it impossible to understand you?
- 3 Discuss whether you agree or disagree with the statements below. Give your reasons.
 - 1 Most misunderstandings happen because pilots and ATCs do not use the radio or mic correctly.
 - 2 The only communication strategy needed to resolve misunderstanding is the phrase 'say again'.

Section four – Language development

Functional English – Describing sensory impressions

1 Match the beginnings and endings of the sentences.

- | | |
|--|--|
| 1 The plane looks ... | a she has a lot of traffic to deal with at the moment. |
| 2 This is your captain speaking. I'm afraid it looks like ... | b be lifting. |
| 3 Dumping the fuel seemed like ... | c damaged. |
| 4 It felt as if ... | d he is going to pass out. |
| 5 It doesn't look as though the passenger ... | e relaxed and in control. |
| 6 The fog appears to ... | f we may have to divert to another airport. |
| 7 The flight attendant gave the impression that ... | g a good idea at the time. |
| 8 The controller sounds like ... | h is going to calm down. |
| 9 The passenger looks as if ... | i the right wing was heavier than the left. |
| 10 The pilot sounds ... | j there might be a problem with one of the passengers. |

Describing 3-D position and movement

2 Complete the sentences with words from the box.

like as looks seems though appears impression sounds

- One of the engines _____ strange, so we'll get it checked.
- It feels _____ if the cabin temperature has dropped.
- The runway _____ wet.
- It _____ like it always rains when I come to London.
- That Cessna _____ to be preparing to take off.
- It looks _____ the windshield is icing up.
- It looks as _____ we're going to be delayed.
- The sunshine gives the _____ that the air temperature is warm, but in fact it's well below freezing.

3 Underline the correct alternative.

- The helicopter hovered just *above* / *into* the helipad before landing.
- He looked *under* / *around* and all he could see was thick fog.
- Please stow your bags *below* / *down* the seat in front of you.
- The pilot looked *down* / *out of* and saw the burning aircraft on the runway.
- The jumbo jet was towed *over* / *into* the hangar.
- Lifejackets are found *over* / *under* your seats.
- We eventually managed to climb *down* / *out of* the fog.
- She suggested flying *over* / *through* the city to get a good view.
- He changed his heading to avoid going *under* / *through* the hailstorm.
- They decided to divert and fly *towards* / *down* Seattle instead.



Resolving misunderstanding

4 Rearrange the words to make sentences.

- a / belly / do / landing / mean / you ? _____ ?
- again / emergency / I / landing / request / say _____.
- correct / it / fuel / have / is / little / remaining / that / you ? _____ ?
- back / full / in / please / read _____.
- again / is / poor / reception / say _____.
- is / no / incorrect / that _____.
- is / on / reading / screen / the / the / wrong _____.
- allow / cannot / land / please / that / to / understand / we / you _____.
- but / haven't / I'm / you / sorry / understood _____.



Vocabulary – Landing gear and braking

1 Match the verbs 1–10 with the definitions a–j.

- | | |
|--------------|---|
| 1 collapse | a to become too hot |
| 2 extend | b to become caught or held in a position so that you cannot move |
| 3 seize | c to form a row with other people |
| 4 get stuck | d to fall down suddenly |
| 5 line up | e to draw something in, eg the landing gear after take-off |
| 6 flare | f to make something go to its full length, eg the landing gear after take-off |
| 7 overheat | g to land |
| 8 retract | h to land on the rear landing gear to absorb the force of the landing |
| 9 touch down | i to raise the nose of an aircraft during take-off |
| 10 rotate | j to suddenly stop moving or working properly |

Other uses of prepositions

2 Complete the sentences with a suitable preposition.

- The sun is so low that from turning finals _____ two miles _____ just before touchdown, you can't see _____ you.
- _____ short final, the runway looks too short.
- You can't go around because there is a mountain _____ the way.
- The runway is _____ a +18.5% gradient.
- The 05 instrument approach _____ SXM is a VOR / DME.
- The fun started once eastbound _____ approach.
- TGU is situated _____ a basin _____ mountains.
- They removed a small mountain _____ the approach path.

FUEL

Section one - Aviation and global warming

- 1 Match a word on the left with a word on the right to make collocations relating to global warming.

- | | |
|-------------------|-------------|
| 1 air | a change |
| 2 carbon | b layer |
| 3 climate | c emissions |
| 4 CO ₂ | d gases |
| 5 greenhouse | e dioxide |
| 6 the ozone | f pollution |

- 2 Work in pairs. Do you think that the effect of aviation on global warming in the media is accurate or exaggerated?

- 3 Read the text and decide if the following organizations believe that air traffic is having an impact on global warming. Circle yes or no.

- | | |
|---|----------|
| 1 the European Commission | yes / no |
| 2 the International Air Transport Association (IATA) | yes / no |
| 3 the European Federation for Transport and Environment (T & E) | yes / no |

Myth or reality?

Aviation and global warming

With air traffic and greenhouse gas emissions growing steadily, the European Commission has suggested limiting CO₂ emissions for all planes departing from EU airports. It stated that uncontrolled aviation growth cannot be allowed to continue.

Although research into more fuel-efficient aircraft continues, the idea that this will reduce pollution is unrealistic as the growth in the number of aircraft flying is greater than the savings in fuel-efficiency. The Commission is worried that aviation emissions are growing faster than in any other sector.

The International Air Transport Association (IATA) wants to restore a balanced view on aviation and global warming. It issued a five-point brief aimed at killing allegations that air transport is a major source of greenhouse gas emissions. Here are some of the figures that the IATA puts forward to disprove the myths:

- 1 Air transport contributes only 2% of global CO₂ emissions.
- 2 Over the last 40 years, emissions per passenger kilometre have decreased by 70%.

- 3 Airline fuel-efficiency has improved by 20% in the last decade.
- 4 80% of aviation emissions are related to flights over 1,500 km for which there is no alternative mode of transport.

However, the European Federation for Transport and Environment (T & E) disagree with IATA's conclusions. T & E don't think they need to reconsider their view, and describe IATA's information as inaccurate. T & E argues that:

- 1 The 2% figure refers only to CO₂ emissions, not other climate impacts such as aviation-induced cirrus clouds.
- 2 The 2% figure is from 1992, which fails to include the explosion in growth of global aviation in the last 15 years.
- 3 The true global contribution to climate change of aviation is between 4 and 9%, depending on the impact of aviation-induced cirrus clouds.
- 4 Aircraft fuel efficiency has not improved at all. Typical passenger aircraft of the 1950s were as fuel-efficient as typical modern jets.



4 Read the text again and decide which organization each statement relates to. Write *EC*, *IATA*, or *T & E*.

- | | |
|---|-----------|
| 1 We must limit the growth of aviation. | <u>EC</u> |
| 2 Most CO ₂ emissions are caused by long flights. | ___ |
| 3 Air transport is responsible for up to 9% of the human effect on climate. | ___ |
| 4 Air traffic is responsible for under 5% of CO ₂ emissions. | ___ |
| 5 We need to consider the effect of cirrus clouds caused by emissions. | ___ |
| 6 Fuel-efficiency is not improving fast enough to reduce pollution. | ___ |
| 7 CO ₂ emissions are 70% lower than 40 years ago. | ___ |
| 8 Planes are no more fuel-efficient than they were 50 years ago. | ___ |

Vocabulary – Prefixes

Change the words below to create negatives and put them in the correct column of the table.

able (x2)	adequate	agree	authorized	available	valid
prove	connect	controlled	correct	sufficient	usual

dis-	in-	un-

Functional English – Suggesting solutions to problems

- 1 Work in pairs. What can we do to reduce air pollution from aviation? List your points.
- 2 Read the text. Does it mention any of the same points that you listed?
- 3 Read the text again and underline the expressions for suggesting solutions.

The growth of air travel in the years to come will have a big impact on the environment, and we need to consider how we will be able to deal with these issues. Let's look in more detail at air pollution. Aircraft emit nitrogen oxides, carbon monoxide and hydrocarbons that can be harmful to the environment. One solution to this could be to improve engines and make them more fuel-efficient. Another option would be to increase fuel-efficiency by improving the aerodynamics of aircraft and building them with more lightweight materials. Alternatively, governments could impose very heavy taxes on long-haul flights. The tax money could then be invested into forestation and other environmental projects. An alternative to this would be to reduce the number of domestic flights altogether and transfer passengers from planes to trains.

Speaking

- 1 Work in small groups. Try to use the language you underlined above. What can we do about the following problems:
 - noise pollution from airports
 - dealing with airport waste
 - water pollution from de-icing
 - destruction of landscape and wildlife habitats by new airport building?
- 2 Work in small groups. How can the following people or organizations maximize fuel efficiency in aviation?
 - ATC
 - pilots
 - aircraft operators
 - aircraft designers



Section two - Gimli glider

1 Match the nouns 1-9 with the definitions a-i.

- | | |
|-------------------|--|
| 1 fuel capacity | a the amount of fuel that an aircraft is carrying |
| 2 fuel flow | b a piece of equipment that measures the amount of fuel |
| 3 fuel gauge | c a piece of equipment for sending fuel into or out of something |
| 4 fuel hose | d the force that fuel produces in an area or a container |
| 5 fuel load | e the continuous movement of fuel |
| 6 fuel pressure | f a lack of fuel |
| 7 fuel pump | g fuel that an aircraft or vehicle is able to carry |
| 8 fuel shortage | h failure of fuel to reach the engine |
| 9 fuel starvation | i a tube that fuel flows through |

2 Work in pairs. Discuss the following questions.

- Have you ever run out of fuel while driving? What happened?
- Have you ever heard of an incident where a plane has almost run out of fuel during flight?
- Why might a flight suddenly run out of fuel?
- What procedures do pilots and controllers follow in case of such an event?

3 25,26 Listen to a radio report of an incident in Canada, and choose the best headline.

Boeing 767 makes emergency landing after hole in fuel tank

Canadian flight diverted for refuelling

Silent flight crash-lands at sports event

Canadian Air Force tests Boeing 767's gliding potential

Busy runway used for go-carting



4 25,26 Listen again and answer the questions.

- Why did the pilot of the Boeing 767 have to divert?
- What were the two main causes of this incident?





5 25,26 Decide if the sentences are true or false. Write *T* or *F*. Then listen again and check.

- 1 The plane was on its way to Ottawa when the problem occurred. _____
- 2 The pilots switched off one of the engines to save fuel. _____
- 3 Two warning lights indicated a fuel problem. _____
- 4 The pilots diverted to a disused airfield in Winnipeg. _____
- 5 John Haskins said that the plane suddenly appeared with little noise. _____
- 6 Helen Clitheroe said that all they could do was stand and watch. _____
- 7 Passengers received minor injuries on leaving the plane. _____
- 8 Reports say that there was no problem with the fuel gauges. _____
- 9 The problem occurred because someone failed to verify the fuel load by hand. _____

Pronunciation – Information groups

1 Read this extract from the radio report, which the punctuation has been removed from. Put a forward slash (/) where you think there should be a pause between information groups.

initial reports indicate problems with the fuel system / it seems that the cockpit fuel gauges were inoperative in this situation after the fuel hoses are removed the fuel load is checked by hand like when you check the oil in your car the fuel measurement was then converted from volume to weight the problem was that the calculation was done in pounds but the new Boeing 767 is a metric machine and so and the system thought the data was in kilograms not in pounds the aircraft had just half the required fuel for the journey and the crew had no idea

2 Read the text out loud, pausing at the end of each information group.

3 26 Listen and compare.

Speaking

1 In groups, rank the places for an emergency landing of a commercial plane (1 = the most ideal, 10 = the least ideal).

- | | |
|----------------|-------|
| beach | _____ |
| football pitch | _____ |
| forest | _____ |
| frozen lake | _____ |
| golf course | _____ |
| marshland | _____ |
| highway | _____ |
| river | _____ |
| rough farmland | _____ |
| sea | _____ |



2 Explain and discuss your reasons for your choice with the rest of the class.



Section three – Fuel icing

- 1 What are the main problems for aircraft flying in extremely low temperatures?
- 2 27 Listen to the incident and answer the questions.
 - 1 What can you say about the weather conditions?
 - 2 What happens to the flight as it enters the control tower's airspace?
 - 3 What happens in the end?
- 3 27 Listen again and underline the correct information.
 - 1 Fuel flow is *lower* / *higher* than it should be.
 - 2 The reading of torque pressure should be *40* / *100*.
 - 3 The pilots request *fire*, *crash*, *rescue services* / *vectors* from the control tower.
 - 4 There are *22* / *122* people on board.
 - 5 The pilots land *on a river* / *in a field*.
 - 6 *Nine* / *No* people are injured after the landing of the plane.

Functional English – Expressing expectation

We often use *should*, *be supposed to* and *be meant to* to express how the situation is expected to be, especially when there is a problem.

*Fuel flow is very low. It **should be** much higher.*

*You're **supposed to be** on final now. Are you OK?*

*Torque pressure **is meant to be** at one hundred, not forty.*

- 1 Complete the sentences using *should*, *be supposed to*, *be meant to* in the correct form.
 - 1 The temperature is high but
it should be much lower (should).
 - 2 The fuel flow is low but _____ (should).
 - 3 The light is on but _____ (should not).
 - 4 The landing gear is down but _____ (not supposed).
 - 5 The supply is still on but _____ (meant).
 - 6 The torque pressure is at 40 but _____ (meant).
 - 7 They don't have enough fuel but _____ (should).
 - 8 They're not on final but _____ (supposed).
 - 9 The warning lights are flashing but _____ (not meant).
- 2 Work in pairs. Make a list of rules or procedures that are not always followed correctly. Try to use the language from 1. Then compare your list with the rest of the group.



Pronunciation – Long and short vowel sounds

- 1 28 Listen to eight words. Write A or B, according to the word you hear.

A	B
1 shot	short
2 cot	caught
3 sit	seat
4 hit	heat
5 live	leave
6 stat	start
7 chat	chart
8 Mach	mark

- 2 28 Listen again and repeat the words.
- 3 Work in pairs. Take turns to read one word from each line. The person listening must say if they hear A or B.

Speaking

Work in pairs. You are going to help each other deal with fuel problems while flying. Student A look at this page. Student B look at page 110.

Student A

- 1 You are a flight instructor on the ground. Your partner is a student pilot on a solo flight in a Cessna 172SP. He / She has fuel problems and engine power loss. He / She can't remember all of the power loss checklist and is busy trying to fly the aircraft. You have radio communications. The checklist on the right shows the correct control settings for the situation. Find out what mistakes the pilot has made and correct them. Use language from the Functional English section.

ENGINE POWER LOSS DURING FLIGHT

air speed	= 68 KIAS
fuel shut-off valve	= ON (= fully in)
fuel selector valve	= BOTH
auxiliary fuel pump switch	= ON
mixture	= RICH (= fully in)
ignition switch	= BOTH

- 2 Change roles. Your partner is the flight instructor on the ground. You are a student pilot on a solo flight in a Cessna 172SP. You have fuel problems and are going to make a power-off landing. You can't remember all of the manual's checklist for this situation. You have radio communications. Listen to your instructor and use the picture to check your control settings. Find out what mistakes you have made and correct them.





Section four – Language development

Functional English – Suggesting solutions to problems

1 Rearrange the words to make sentences.

1 engines / be / make / solution / one / more / to / fuel-efficient / would

2 another / charging / fuel / higher / is / option / start / to / taxes

3 a / be / bio-diesel / corn / create / made / of / one / or / option / soybeans / to / would

4 aircraft / alternative / an / be / fuel-efficient / make / more / that / are / to / would

5 about / can / carry / having / how / hundreds / jets / jumbo / more / of / or / passengers / that ?

6 alternatively / by / could / how / often / plane / reduce / travel / we / we

Expressing expectation

2 Underline the best alternative in sentences 1–10.

- 1 The fuel tankers *should / supposed to / meant to* have arrived by now.
- 2 The landing gear *meant to / is supposed / shouldn't* to be down for landing.
- 3 The flight was *shouldn't / not meant to / supposed to* depart at 1600 hours but was delayed because of fog.
- 4 You're *shouldn't / not supposed / not meant to* move from the taxiway until you are given direct instructions.
- 5 We were *should have / meant to / supposed* land an hour ago.
- 6 TCAS *should / is supposed / meant to* assist both pilots and controllers in taking appropriate action in order to avoid a possible collision.
- 7 The fuel hoses *should / supposed to / meant to* be working properly.
- 8 The oxygen masks *meant to / are supposed / should* be used in case of depressurization.
- 9 I was *shouldn't / meant to / not supposed to* be this close to the coast. I think I have made a mistake with my heading.
- 10 The warning light *not meant to / shouldn't / not supposed to* be flashing.

Vocabulary – Climate change

1 Complete the definitions 1–6 using words from the box, and match each one with a noun a–f.

substances breathe escaping rise atmosphere protects

- 1 gases that stop heat from _____ from the atmosphere and therefore cause temperatures to rise on Earth
- 2 carbon dioxide that vehicles and factories produce and send into the _____
- 3 chemicals and other _____ that have a harmful effect on air
- 4 a layer in the Earth's atmosphere that _____ the Earth from the harmful effects of the Sun
- 5 the _____ in the temperature of the Earth that is caused partly by increasing amounts of carbon dioxide in the atmosphere
- 6 the gas that is produced when you _____ out

- a carbon dioxide
- b ozone layer
- c global warming
- d greenhouse gases
- e air pollution
- f CO₂ emissions



Prefixes

- 2 Make words that match the definitions by adding the prefixes in one box to the verbs and adjectives in the other box.

ab- de- dis- in- out- over- re-
trans- under- un-

perform crowded operative powered ice
start realistic used normal atlantic

- 1 across the ocean _____
- 2 no longer used _____
- 3 not having enough power _____
- 4 not probable _____
- 5 not working _____
- 6 not usual _____
- 7 to perform better than something else _____
- 8 to remove ice _____
- 9 to start again _____
- 10 containing too many people _____

- 3 Complete the sentences with a word made with a prefix and a word from each box.

in- mis- over- re- under-

set informed accurate estimated fuel
efficient diagnosed weight consider

- 1 Let's reset all the controls to zero and start the procedure again.
- 2 We were _____ – we were told we'd be taking off at 1830, not 1815.
- 3 They _____ the amount of fuel needed for the journey, so the plane had to divert to _____.
- 4 The aircraft is _____ for landing, so we'll have to dump fuel.
- 5 We were going to use runway 4R, but as the wind has changed direction we'll have to _____ which one to use.
- 6 I think the altimeter is giving _____ readings – we're clearly higher than 500 ft.
- 7 The system for manual refuelling is _____ – it takes a long time and there are often mistakes.
- 8 They _____ the problem as fuel freezing, when in fact there was no fuel left in the tank.

Nouns for fuel

- 4 Rearrange the letters to form the missing words.

Most recently-built planes have two fuel (1) **nstka** _____ or cells which are located in the wings. The fuel (2) **tacpaiyc** _____ for each aircraft is determined by its wing geometry. In a lot of aircraft, (3) **smpup** _____ are required to feed the fuel through (4) **soshe** _____ from the cells to the engine. For every fuel cell there is a fuel (5) **eagug** _____ that the pilot can read from the cockpit in order to keep an eye on the fuel (6) **espruse** _____. The continuous movement of fuel is called fuel (7) **ofwl**, _____ and the fuel (8) **scnoupitmon** _____ is a measure of the fuel used up by the engine. If the movement of the fuel is somehow slowed down, or if there is a (9) **ethasgor** _____ of fuel, this can cause fuel (10) **vistanrato** _____, which in turn can cause loss of power in the engine.

Missing verbs

- 5 Complete this letter and reply from an Internet pilots' forum with the verbs in the box.

cooking flood leaking popping prevent shut off
restarting running shutting down turned on

Pete

I have an airplane with an IO360 engine. After landing you can hear fuel still (1) _____ to the engine which causes it to (2) _____. (3) _____ the engine after that can be a nightmare. Seems there needs to be a valve to (4) _____ the fuel flow from the splitter after (5) _____ the engine. Do you know of anything on the market that can stop the flow of fuel after stopping to (6) _____ flooding?

Chris

Hi Chris

There is no real flow of fuel in an injected engine if the engine is not running and the boost pump is not (7) _____. It sounds to me that what you are hearing is the fuel (8) _____ in the warm injection lines. Is it kind of a (9) _____ sound? If there is some hesitation when shutting down, the centre body seal of the injector could be (10) _____.

Pete

PRESSURE

Section one - Blast

- 1 Work in groups. Talk about any incidents of rapid decompression you have heard about.
- 2 Read the story and decide if the sentences are true or false. Write *T* or *F*.
 - 1 The co-pilot saved the captain from being sucked out of the plane.
 - 2 The co-pilot tried to stop the plane dropping.
 - 3 They didn't have time to dump fuel.
 - 4 The pilot was unconscious during the incident.



Hanging on to life

Explosive decompression at 17,000 ft



We took off dead on time, and 13 minutes later we reached 17,000 feet. I was offering the crew tea when suddenly there was an enormous explosion and the door was blown off its hinges. Within seconds, the plane started to drop.

The front windscreen had blown away and Tim, the captain, was being sucked out. I jumped across the cockpit and grabbed his waist. His body was outside the aircraft, bent over the top and his legs had stuck under the controls, disabling the

autopilot. I could feel I was about to be sucked out myself when the chief steward, John, wrapped the captain's shoulder strap around me. The co-pilot, Alistair, was fortunately still strapped in his seat.

Pressure soon equalized with the speed of our fall, and the icy air rushed into the aircraft, blowing charts around the cabin. Alistair increased speed further, and it took just two minutes to get down to 11,000 ft, where there was more oxygen to breathe.

We could see Tim's face outside the window, covered in blood. While I was holding Tim, another steward strapped himself into the third pilot's seat and gave me a hand.

Alistair had managed by now to reconnect the autopilot, and was being talked down to Southampton Airport. For a co-pilot, Alistair was in a very challenging situation, flying alone and without charts into an airport he didn't know. The plane was fully loaded with fuel, but it could take up to five minutes to dump fuel, and with the captain hanging out of the aircraft, he had no choice but to land.

Alistair did a brilliant landing, stopping the heavy aircraft three-quarters of the way down the 1,800 m runway. The whole incident from explosion to landing lasted 18 minutes, but it seemed like hours. We hoped we'd got down in time to save Tim.

By the time we landed, Tim had spent 18 minutes outside the cockpit. During this time he'd been unconscious. When he regained consciousness on the stretcher, his first words were 'I want to eat.' Typical pilot!

3 Complete the table.

Name	position
Nigel	steward
	chief steward
Alistair	
Tim	

4 Work in pairs. Answer the questions.

- Why did they lose the autopilot?
- Who first stopped Nigel, the steward, from being sucked out?
- Why wasn't Alistair sucked out?
- Why did Alistair increase the rate of descent?
- For what reasons was it a very difficult situation for Alistair?
- How did the captain feel when he regained consciousness?

5 Work in pairs. Try to remember what these numbers refer to. Check the text if necessary.

- 13 minutes
- 17,000 ft
- 2 minutes
- 11,000 ft
- 1,800 m
- 18 minutes

Vocabulary – Action verbs

1 Complete the sentences with the words in the box in an appropriate form.

suck drop blow hang jump grab
wrap bang rush

- The left-hand windscreen _____ away.
- The aircraft began to _____ towards the ground.
- The captain was being _____ out of the aircraft.
- The steward _____ over the flight controls.
- Nigel _____ Tim around the waist.
- The steward _____ the shoulder strap around Nigel.
- The captain was _____ out of the aircraft.
- Tim's face was _____ against the window.
- Cold air _____ into the cabin.

2 Close your books. Retell the incident in your own words.

Functional English – Expressing time and duration



1 Complete the sentences from the text.

- We took off dead _____ time.
- _____ seconds, the plane started to drop.
- It _____ just two minutes to get down to 11,000 ft.
- _____ I was holding Tim, Simon strapped himself into the third pilot's seat.
- It could take _____ five minutes to dump fuel.
- The whole incident _____ explosion _____ landing _____ 18 minutes.
- We hoped we'd got down _____ to save him.
- _____ we landed Tim had spent 18 minutes outside the cockpit.
- _____ this time he'd been completely unconscious.

2 Underline the correct time expression to complete the facts about depressurization.

- Oxygen helps avert the effects of depressurization at altitude. The oxygen from these masks usually lasts / takes for about 10 minutes.
- While / During flight an airplane pressurizes and depressurizes, causing some passengers discomfort.
- After depressurization, the pilot has just seconds to get oxygen. If he is unable to do this in time / on time / by the time, he will rapidly lose consciousness.
- A hole a metre and a half across will depressurize a jetliner up to / within seconds.
- Airliners have had pressurized cabins to / from the late 1940s to / from the present day.

Speaking

Work in groups of three. Student A is a journalist, Student B is Alistair, the co-pilot, and Student C is John, the chief steward. Roleplay an interview about the incident. Before you begin, prepare what you are going to say.



Section two - Damage

- 1 Work in pairs. Decide which of the types of damage below could happen to:

- a windshield (W)
- fuselage skin (F)
- landing gear (L)

Write W, F or L next to each word.

- 1 buckled _____
- 2 corroded _____
- 3 cracked _____
- 4 dented _____
- 5 punctured _____
- 6 shattered _____
- 7 smashed _____
- 8 torn _____
- 9 torn off _____
- 10 twisted _____

- 2 29,30 Listen to the conversation and answer the questions.

- 1 Where are the speakers?
- 2 What are they talking about?
- 3 What are the photographs of?



- 3 29,30 Listen again. Tick (✓) the types of damage that are mentioned.

- ☐ cracked windshield
- ☐ spoiler torn away
- ☐ torn fuselage
- ☐ cargo door blown out
- ☐ corrosion
- ☐ metal fatigue
- ☐ buckled tailplane
- ☐ dented leading edges
- ☐ smashed instrument panel

- 4 Circle the correct answer.

- 1 What does the trainer think about the tiny crack incident?
 - a They could have continued their flight.
 - b The best thing to do was to wait for the windshield to be replaced.
- 2 Why did the rear cargo door blow off the DC-10?
 - a The lock on the door was not working properly.
 - b The door hadn't been closed properly.
- 3 What happened to the Boeing 737 on landing?
 - a The nose gear worked correctly.
 - b The nose gear buckled and caused more damage.
- 4 What happened when the Boeing 767 was damaged by a flock of birds?
 - a The crew landed the plane.
 - b The captain was injured.
- 5 What does the trainer say about the efficiency of cabin simulators?
 - a A cabin simulator is ideal for practising emergency situations.
 - b A cabin simulator is not really the same as a real emergency situation.



Functional English – Summarizing

- 1 29 Listen to the first part of the workshop and choose the best summary of the Boeing 737 incident.
 - a There was a sudden depressurization problem and a member of the cabin crew was killed.
 - b Metal fatigue can cause severe damage, causing danger of explosive decompression.
 - c A section of fuselage was torn from a Boeing 737 due to corrosion and metal fatigue, causing rapid decompression. One person died in the incident but the crew landed safely.
 - d When a large section of fuselage is lost, the cabin depressurizes immediately, and passengers and crew may be sucked from the aircraft.
 - e A Boeing 737 lost 35 m² of fuselage. It lost all electrics, communication lines and power supply. The airframe buckled and the nose dropped down. Fortunately, the landing gear worked correctly.
 - f In April 1998, a large section of upper fuselage tore away from a Boeing 737. One member of the cabin crew was sucked from the aircraft and died.
 - g A section of fuselage was torn away, but the plane landed safely.
- 2 30 Now listen again to the rest of the extract. Make notes on the other incident described.
- 3 Write a summary of the incident, then compare your summary with another student's.

Pronunciation – Diphthongs

- 1 The phonetic symbols below represent double sounds, or *diphthongs*.

/aɪ/	/eɪ/	/ɔɪ/	/ɪə/	/əʊ/	/aʊ/	/eə/
pilot	plane	oil	steer	load	around	air

Underline all the words in the text below that contain a diphthong.

Good. Now let's take some of these scenarios and look at some real incidents. I have a series of photographs for you to look at here. Here's a DC-10 in June 1972, whose rear cargo door blew out at flight level 120 due to a faulty lock. The door tore away a spoiler and smashed into the tailplane, resulting in hydraulic loss as well as rapid depressurization. The crew managed to land this aircraft safely with only minor injuries.

- 2 31 Listen to the words containing diphthongs, and write them in the columns below, then listen again and repeat.

/aɪ/	/eɪ/	/ɔɪ/	/ɪə/	/əʊ/	/aʊ/	/eə/

Speaking

Work in pairs. Discuss the questions.

- 1 What materials are typically used to make the main parts of an aircraft, eg fuselage, engines, tyres, windshield? What qualities do these materials need to have?
- 2 How often are the airframes of aircraft checked? What checks are performed? Do different types of aircraft require different checks?





Section three – Emergency descent



1 Work in groups. Discuss what action the crew should take in an incident of sudden decompression.

2 🎧 32 Listen to the dialogue and answer the questions.

- 1 What does the pilot want to do?
- 2 What caused the problem?
- 3 How many people are injured?

3 🎧 32 Listen again and underline the correct information.

- 1 The *pilot / controller* can't hear the *pilot / controller* well at first.
- 2 The pilot is approximately *14 / 40* miles from the airfield.
- 3 The captain has lost *a lot of blood / consciousness*.
- 4 Windspeed on the runway is *11 / 21* kt.
- 5 The flight attendant sees damage to the *fuselage / leading edges* and *engine / tail*.
- 6 One injured passenger is *having breathing problems / bleeding heavily*.
- 7 The pilot reports damage to the *nose / windshield* and *landing gear / tail*.

Pronunciation – Contrastive stress

1 We use stress to correct someone who has misunderstood information.

Not **fifty** minutes – **fifteen** minutes.

Underline the sections of words that should be stressed.

- 1 He's talking about outbound flights, not inbound.
- 2 Good? It was excellent!
- 3 You said the flight would leave at half-past seven, not half-past nine.
- 4 No, my first flight this week is Tuesday evening, not Tuesday afternoon.
- 5 Fly faster. Not slower.

2 🎧 33 Listen to the recording to check your answers. Then listen again and repeat.

3 Work in pairs. You are going to practise correcting each other. Student A turn to page 106.
Student B turn to page 111.



Functional English – Expressing consequences

1 34 Complete the sentences from the dialogue.

- 1 I can't see _____ I get out of my seat.
- 2 We've got to get help soon, _____ he might not make it.
- 3 _____ we don't get to a doctor soon, he may not survive.

2 Complete the sentences using *if*, *otherwise* or *unless*.

- 1 We will have to change our heading, _____ we will hit the hailstorm.
- 2 The aircraft will be too heavy to land on the runway _____ it dumps the remaining fuel.
- 3 _____ the radar isn't showing the aircraft we will need to contact the pilot for their precise position.
- 4 There must be a problem, _____ the pilot would have answered.
- 5 For military flights there's no contact with Air Traffic Control _____ they detect a possible collision.
- 6 You cannot work as an air traffic controller _____ you provide an official medical certificate.
- 7 _____ you don't do more training in the control room, you won't qualify as a controller this year.

3 Decide whether you agree or disagree with the statements below. Write A or D. Then, in pairs, discuss your answers using *if*, *otherwise* and *unless*.

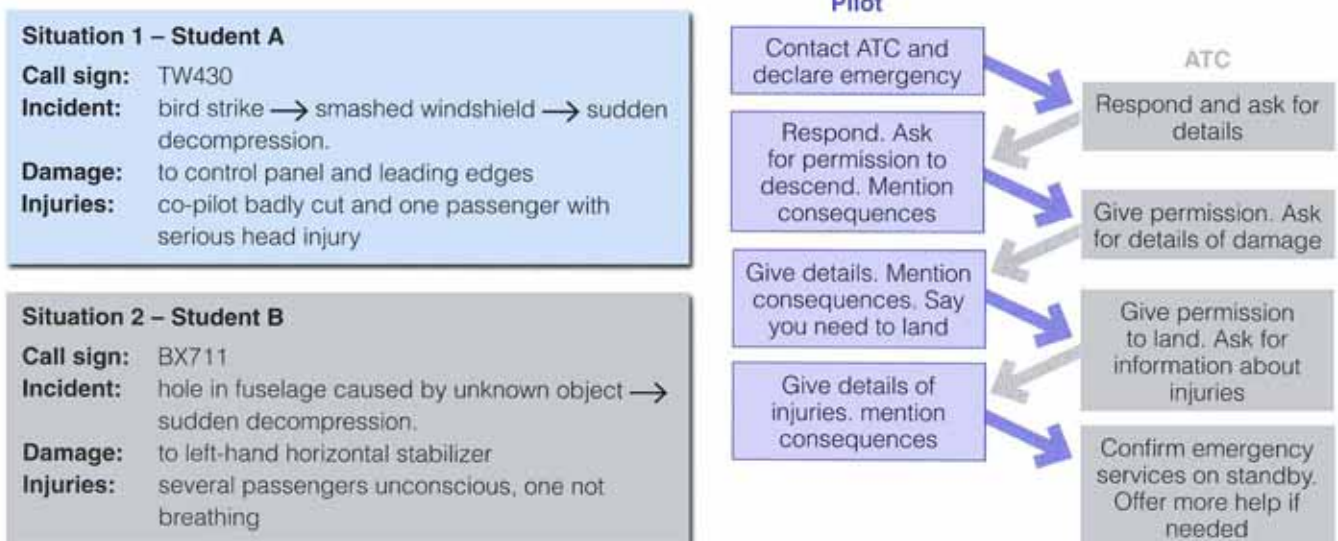
Example

Yes, they must all undergo stress management training, otherwise mistakes will happen.

- 1 Both pilots and air traffic controllers should undergo stress management training. _____
- 2 All ATC should be automated. _____
- 3 Pilots should be free to plan their own routing. _____
- 4 At least one flight attendant should know how to fly a plane in case of an emergency. _____
- 5 Radar should be used in all controlled airspace. _____
- 6 All aircraft control should be computerized. _____

Speaking

Work in pairs. You are going to roleplay an emergency situation. Student A is the pilot. Student B is the ATC. Use the chart and the information below to help you. When you have finished situation 1, swap roles.



Section four – Language development

Functional English – Expressing time and duration

1 Complete the sentences using the words or phrases in the correct form from the box.

by the time during from in time last on time take to up to while within

- The delays are now over, and most flights are taking off _____.
- In some countries it can take _____ three years to become a qualified controller.
- _____ the flight reaches French air space, it will have flown through six different countries.
- It _____ about two years to become a commercial pilot.
- The captain has visited six different cities _____ the last two months in her job.
- We need to complete the roster _____ for tomorrow morning's team meeting.
- Search and rescue operations were launched _____ minutes of the loss of radio contact.
- The maiden flight of the Airbus A380 _____ 3 hours 50 minutes.
- _____ one controller was speaking to the pilot, another was contact MedLink.
- The trainee pilot felt stressed _____ take-off _____ landing.

2 Complete the sentences with the verbs in their correct form from the box.

have lose make manage run out of spend take waste

- Don't _____ your time. I've already called him five times and he isn't answering.
- Pilots _____ time going around the aircraft making sure everything is in order.
- We'd better get something to eat now or we'll _____ time.
- I have a million things to do. I don't _____ time to read the report.
- If you don't _____ time for physical exercise, your health will suffer.
- She's very good at _____ time. She's great at organizing flight plans and schedules.
- We have no time to _____. Let's land as soon as possible!
- You'll have to be patient, sir. These things _____ time.

Expressing consequences

3 Complete the sentences using *if*, *otherwise* or *unless*.

- The cabin needs to be pressurized _____ you fly at over 10,000 ft.
- _____ regular inspections are made, airworthiness can become a problem.
- We need to have the landing gear checked, _____ the problem could happen again.
- We won't arrive on time _____ we take off in the next slot.
- _____ air pressure falls too low, you can suffer from headaches and nausea.
- We're going to need clearance _____ we descend.
- Divers should wait at least a day before flying, _____ they risk getting ill.
- You can get altitude sickness _____ you fly into an airport that is way above sea level.



Articles

4 Complete the gaps in this article with *a(n)* or *the*.

On April 28, 1988, (1) — 737 took off from Hilo International Airport bound for Honolulu with 90 passengers and five crew members on board. Nothing unusual occurred during (2) — take-off and climb.

As (3) — aircraft reached its normal flight altitude of 24,000 feet, (4) — small section on (5) — left side of (6) — roof ruptured. (7) — resulting explosive decompression tore off (8) — large section of the roof, consisting of (9) — entire top half of (10) — aircraft skin extending from just behind (11) — cockpit to (12) — fore-wing area.

(13) — first officer immediately contacted Kahului Airport on Maui to declare (14) — emergency. Sadly, (15) — flight attendant was ejected through (16) — hole. (17) — crew performed (18) — emergency landing at Kahului Airport.



Vocabulary – Action verbs

1 Match a verb on the left with a definition on the right.

- | | |
|---------|---|
| 1 bang | a to be fixed so that the top part is held in position but the bottom part is loose and can move easily |
| 2 blow | b to move somewhere quickly and suddenly |
| 3 drop | c to knock against something when you are moving |
| 4 grab | d to fall |
| 5 hang | e to pull something using the force of air |
| 6 jump | f to hold or keep something in position by fastening a narrow piece of material around it |
| 7 suck | g to take hold of something in a rough way |
| 8 strap | h when air or wind moves |

Verbs describing damage

2 Complete the sentences using words from the box.

blew out broke through corrosion cutting off dented metal fatigue
punctured smashed smashed into buckled tore away from

- The rear cargo door _____.
- The door tore away a spoiler and _____ the tailplane.
- The aircraft had _____ due to operating in a salty environment, and it was a very old aircraft with serious _____.
- Almost 35 m² of metal _____ the upper part of the fuselage, _____ the electrics.
- The lower part of the airframe _____.
- A flock of birds _____ the aircraft nose, fuselage and wing leading edges, and _____ the aircraft skin eleven times.
- One of the birds _____ into the cockpit and _____ the captain's instrument panel.

Section one - Air rage

- 1 Work in pairs. Discuss the question.

Sometimes a person who is normally polite and law-abiding goes 'crazy' during a flight and causes a security incident. What factors cause this change in behaviour?

- 2 Read about four incidents of air rage and match the headlines 1-4 with the stories A-D.

- 1 Pilot leaves inebriated passengers on small island _____
- 2 Flight redirected after passenger's unusual behaviour _____
- 3 Frightened passenger jailed _____
- 4 Need to smoke causes passenger to attack pilot _____

A

A Honolulu-bound Delta Airlines jet was diverted to San Francisco on Tuesday when a female passenger became unruly after trying to smoke in the lavatory. The pilot came back to deal with the disturbance. He threatened to handcuff her if she didn't calm down, but she became hysterical and hit him in the chest. The woman was sedated and taken to hospital by ambulance after the plane landed.

B

72-year-old Franco Massa, who was extremely nervous of flying, became drunk and aggressive during a Munich to Toronto flight. He began to harass an elderly woman beside him and, when a steward tried to intervene, Massa punched the steward. He had to be restrained with plasticuffs by fellow passengers. The pilot felt the disturbance was so severe he diverted to Heathrow. The diversion cost £30,000, and Massa was jailed for twelve months.

C

A transatlantic flight was diverted to Boston after top model Tatiana Vukovsky started to behave very strangely. Flight attendants were alerted about 90 minutes into the flight when she started jumping on her seat and waving a wine bottle. She appeared very agitated and was swearing loudly at the other passengers. Two members of the crew were bitten as they restrained her.

D

Drunken holiday-makers who abused cabin crew on a flight to Tenerife spent 36 hours on a tiny island in the Atlantic after the airline abandoned them, 300 miles from their destination. The men became abusive and aggressive towards staff shortly after their flight took off from Manchester. When they refused to calm down, the pilot took the decision to divert the plane and make an unscheduled stop-off at an airstrip on the tiny Portuguese island of Porto Santo, and the men were removed.

- 3 Read the texts again. In which story:

- 1 did a passenger use offensive language? _____
- 2 were passengers removed from the flight? _____
- 3 did a passenger go to jail? _____
- 4 did passengers become aggressive shortly after take-off? _____
- 5 did someone get bitten? _____
- 6 did a passenger annoy an old lady? _____
- 7 did a passenger have to be taken to hospital? _____
- 8 was the pilot assaulted? _____



Vocabulary – Conflict and restraint

Match the beginnings with the endings to make sentences.

- | | |
|--|---|
| 1 Despite several warnings, the passenger refused | a one of them in the arm. |
| 2 Two of the passengers were behaving in | b a disturbance on the flight. |
| 3 The captain threatened to | c in the knee after he asked her to calm down. |
| 4 The passenger continued to drink more wine until he became | d to cooperate with requests. |
| 5 Three people helped the flight attendant to restrain | e agitated because she was unable to smoke on the plane. |
| 6 She kicked the pilot | f remove the drunken passenger if he didn't return to his seat. |
| 7 The cabin crew got hold of the passenger but he bit | g plasticuffs on him. |
| 8 The crowd of football supporters created | h very drunk. |
| 9 The traveller was | i the passenger and sit her down at the rear of the plane. |
| 10 The cabin crew eventually managed to put | j a noisy and violent way. |

Functional English – Focusing on actions

Look at these sentences from the texts, which all focus on the action rather than on the person, thing, etc. that is doing the action.

The woman **was taken** to hospital by ambulance after the plane landed.

He had to **be restrained** with plasticuffs by fellow passengers.

Massa **was jailed** for twelve months.

Two members of the crew **were bitten** as they restrained her.

The men **were removed**.

Change the sentences below so that they focus on the actions in the same way as the examples above.

- People injure dozens of flight attendants each year in air rage incidents.
Dozens of flight attendants are injured each year in air rage incidents.
- They keep plastic restraints on all flights to deal with violence on board.

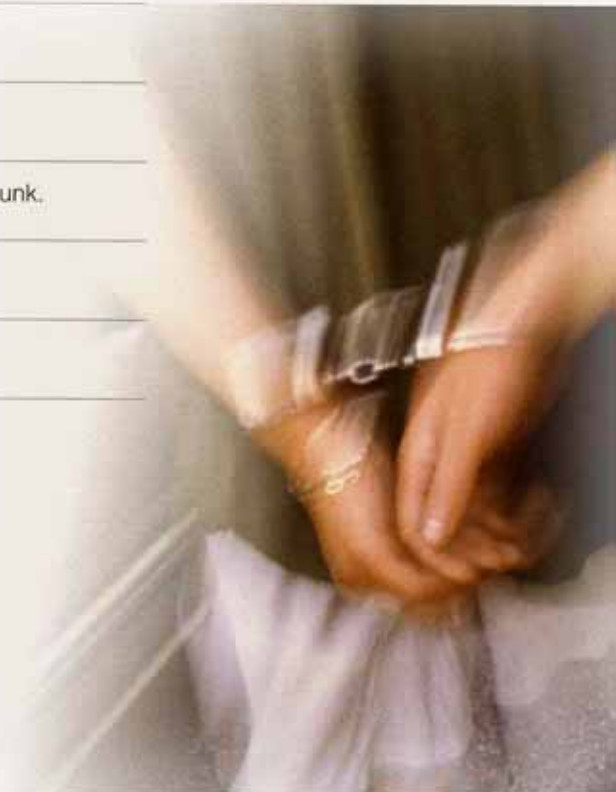
- They give cabin crew training for dealing with aggressive passengers.

- They used a belt to restrain the passenger.

- They didn't allow the passengers to board the flight because they were drunk.

- We have diverted this flight and will be landing shortly.

- Police will arrest this passenger as soon as we land.



Speaking

Work in small groups. Discuss the questions.

- How could airlines prevent air-rage incidents?
- How should cabin crew be trained to deal with these incidents?
- How should violent passengers be restrained?
- How should passengers be punished for such incidents?
- Do you know any stories of air rage incidents?



Section two – Suspicious passengers



- 1 Work in pairs. Discuss the questions.
 - 1 What methods currently exist to identify a suspicious passenger at the airport?
 - 2 What body language do you associate with a suspicious passenger? Make a list.
- 2 35 Listen to security expert Kalle Kaub talking about a new technique for screening potentially dangerous passengers. Does he mention any of the same body language you listed?
- 3 35 Listen again and answer the questions.
 - 1 What does Kalle think of technology in airport security?
 - 2 Why do criminals behave differently to other passengers?
 - 3 What parts of the face make small movements when someone is nervous?
 - 4 What do Kalle's officers do if they are suspicious of a passenger?
 - 5 What three things can happen in a 'secondary screening'?
 - 6 What types of crime have already been stopped using this technique?

Vocabulary – Strange behaviour

Complete the sentences with the words from the box.

body eye hand head leg lips palms voice

- 1 Officers try to make friendly _____ contact to see if a suspicious person reacts normally.
- 2 Passengers undergo a _____ search to check that they are not carrying any weapons.
- 3 One sign of a passenger acting suspiciously is stepping forward on the left _____.
- 4 Moving the _____ forward is a common sign of aggressive behaviour.
- 5 Officers should look for small movements of the _____.
- 6 A _____ position with the _____ down can indicate suspicious behaviour.
- 7 A rise in the volume and pitch of the _____ is a sign of stress.

Functional English – Expressing possibility and probability

might / may / could = it's possible

probably = you're not sure, but you think it's likely

must = you're sure – there is no other possibility

can't = it's impossible

1 Underline the correct alternative in sentences 1–7.

- We're looking for any physical signs that *could* / *must* show that someone is nervous or angry – signs that they *can't* / *might* be planning a criminal act.
- If people show just one sign of stress, they *can't be* / *are probably not* a threat.
- But if you observe multiple signs, then you can assume that they *must* / *can't* have something to hide.
- If they detect behaviour that indicates a person *may* / *must* be a threat to security or the safety of a flight, they attempt to engage in casual conversation with that person.
- Surely friendly conversations *might* / *can't* be enough to indicate if a passenger is a criminal?
- Of course these questions *can't* / *probably* determine if a passenger has criminal intentions, but they *might* / *must* indicate suspicious behaviour.

- 35 Listen to the extract again and check your answers.
- Work in pairs. You are going to explain strange passenger behaviour. Student A go to p 106 and work with another Student A. Student B go to p 112 and work with another Student B.

Pronunciation – -tion, -sion, -cion endings

- 36 Work in pairs. Look at the words below. Answer the questions and then listen to check your answers.

detection possession suspicion

- How do you pronounce the ending?
- Which syllable is stressed – the first, the second, or the last?

- 37 Underline the stressed syllable in the following words, then listen and repeat.

aviation reaction conversation immigration
inspection intentions reduction violations



Speaking

- A small international airport is being built, and airport management have to decide how to spend their limited security budget of 1,000 points. Work in pairs. Discuss how you would spend the 1,000 points and why you have chosen the security measures that you have.

1	perimeter fence patrolling	100 points
2	CCTV (external and internal)	250 points
3	an armed police service	450 points
4	behavioural screening training	100 points
5	explosive detection swabbing	100 points
6	explosive detection machines	200 points
7	fingerprint / face biometric profiling devices	150 points
8	luggage scanning (for organic and inorganic materials)	300 points
9	baggage inspection / personal search officers	250 points
10	sniffer dogs	200 points
11	a bomb disposal unit	400 points
12	airport personnel swipe-card / fingerprint system on doors on secure areas	250 points

- Form one group. Each pair should present their ideas. The group must reach a decision on how to spend the points.



Section three – Unlawful interference

1 Work in pairs. Discuss the questions.

- 1 What measures do airlines take to prevent passengers getting into the cockpit?
- 2 Do you know of any incidents where a passenger has tried unsuccessfully to enter the cockpit? What happened?

2 38,39 Listen to this incident aboard a passenger jet, and underline the correct information.

- 1 There is a very *violent* / *drunk* passenger on board.
- 2 The plane is entering *Japanese* / *Korean* airspace.
- 3 They decide to *divert and land* / *return to their departure airport*.

3 38,39 Listen again and answer the questions.

- 1 Who does the man hit?
- 2 How do they restrain the man?
- 3 Why is the man violent?
- 4 What does the pilot tell the attendant to do with the man?
- 5 What services do they request at the airport?
- 6 How many passengers are on board?
- 7 When will they enter Korean airspace?

Pronunciation – Information groups and stress

1 Read the extract from the listening and put a forward slash (/) where you think the pauses should go.

PNF centre Interflight 547 a passenger has attempted to enter the flight deck he's also attacked the cabin crew there are injuries we have restrained him but we need to get him off the plane as soon as possible

T Interflight 547 understand you have an unlawful interference please say fuel and persons on board

PNF er 178 persons and four hours of fuel remaining can we descend to the nearest available aerodrome we'll need medical and security services ready Interflight 547

T Interflight 547 you are approaching Korean airspace contact Incheon control on 123.6 I'll advise them of your situation and pass on your request

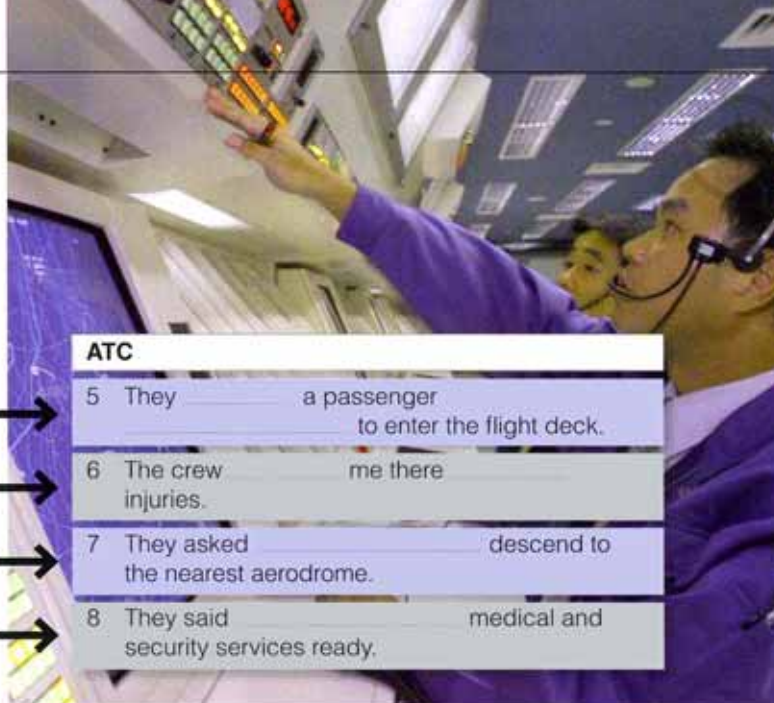
2 Now underline the parts of words that are stressed, and double underline the part of each information group that carries the main stress.

3 39 Listen and check your answers.

Functional English – Reporting

- 1 Work in pairs. Look at the pilot's original sentence to the Tokyo ATC, and how the ATC reported the same information. Try to complete the sentences with the missing verbs.

Pilot
1 A passenger _____ to enter the flight deck.
2 There _____ injuries.
3 _____ descend to the nearest available aerodrome?
4 _____ medical and security services ready.



ATC
5 They _____ a passenger to enter the flight deck.
6 The crew _____ me there injuries.
7 They asked _____ descend to the nearest aerodrome.
8 They said _____ medical and security services ready.

- 2 39 Listen again and check your answers.

- 3 Work in pairs. Discuss the questions.

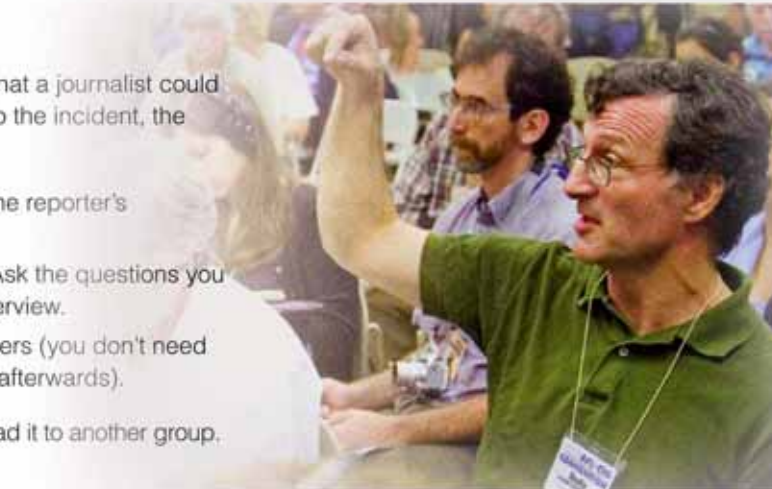
- What usually happens to the tense of verbs in reported speech?
- What happens to *can* and *will* in reported speech? What do you think happens to *shall*?

- 4 Read the direct quote and then change the sentence using the reporting verb given.

- 'Sir, you have to leave the plane now.'
The security guard told _____.
- 'Shall I contact MediLink?'
The captain asked _____.
- 'One of our flight attendants has been injured.'
The pilot said _____.
- 'Contact Incheon Control.'
The air traffic controller told the pilot _____.
- 'We have an emergency in the cabin.'
The flight attendant said _____.
- 'There are three serious injuries on board.'
The co-pilot told the ATC _____.
- 'We would like to divert to another airfield.'
The pilot said _____.

Speaking

- Work in groups of three. First, write down ten questions that a journalist could ask the head of airport security about his / her reaction to the incident, the measures in place, etc.
- Student A, you are the head of airport security. Answer the reporter's questions about the incident.
Student B, you are a reporter for a national newspaper. Ask the questions you prepared, and any others that you think of during the interview.
Student C, listen and note down the questions and answers (you don't need to write every word – just enough to help you remember afterwards).
- Work together to write a report of the interview, and then read it to another group.





Section four – Language development

Functional English – Passive

1 Complete the sentences using the passive form of the verb in brackets.

- 1 Because of severe fog in the area, the flight was diverted. (divert)
- 2 Two football supporters _____ the flight. (throw off)
- 3 A flight attendant _____ by the unruly passenger. (assault)
- 4 The aggressive traveller _____ to the ground by a flight attendant and two passengers. (force)
- 5 The captain _____ in the stomach by the drunken passenger. (punch)
- 6 Passengers _____ that the plane was experiencing technical problems. (inform)
- 7 The controller _____ to take a leave of absence following the incident. (tell)
- 8 The commercial flight _____ to fly through the military airspace. (not allow)
- 9 The Airbus A320 _____ for any damage after the emergency landing. (check)
- 10 The jumbo jet _____ on arrival at Turin airport. (refuel)

Expressing possibility and probability

2 Match the beginnings with the endings to make sentences.

- | | |
|---|---|
| 1 Oxygen deprivation ... | a ... could do is ask MedLink for some advice. |
| 2 We are diverting as we ... | b ... might miss our flight. |
| 3 They will ... | c ... might be a cause of air rage. |
| 4 One thing we ... | d ... can't board the plane just yet. |
| 5 If we don't descend immediately, the man ... | e ... must have something to hide. |
| 6 Her behaviour is extremely strange which means she ... | f ... probably arrive ahead of schedule because of a tail wind. |
| 7 There is a suspicious package near one of the gates so we ... | g ... may die. |
| 8 We must hurry, otherwise we ... | h ... can't land on the runway because of excess surface water. |

Reported speech

3 Underline the correct form.

- 1 The controller *told* / told us to go around.
- 2 Some passengers *refused* / refused to cooperate with the crew's requests.
- 3 The tower said that *us* / we would have to wait for the next slot.
- 4 Can you ask the flight attendants *counting* / to count the passengers again?
- 5 We'd better *ask* / ask for confirmation of the runway.
- 6 Tell the cabin crew *that* / to take their seats for take-off.
- 7 Ask the pilot *state* / to state his intentions.
- 8 I'll *request for* / request information about the landing conditions.
- 9 Can you tell *us* / to us what you are planning to do?
- 10 I'm going to *ask to* / ask the tower *clearance* / for clearance to land.



4 Change the following sentences from direct speech to reported speech using the verbs in brackets.

- Pilot** I think it's a good idea if we delay take-off.
1 The pilot said he thought it was a good idea if we delayed take-off. (say)
- Pilot** Place the passenger at the rear of the plane.
2 _____ (tell)
- Passenger** I would like a glass of water, please.
3 _____ (ask)
- Controller** Confirm your position please.
4 _____ (ask)
- Man** I'm a qualified pilot.
5 _____ (mention)
- Pilot** We need to make an emergency landing.
6 _____ (request)
- Pilot** We have a problem.
Controller Please give more information.
7 _____ (advise)
8 _____ (ask)

Vocabulary – Physical conflict and restraint

1 Rearrange the letters to show the correct word for the definitions 1–10.

- | | |
|------------------------|--|
| 1 acomilius | intended to hurt or upset someone _____ |
| 2 revosun | feeling excited or worried, or slightly afraid _____ |
| 3 gyarn | very annoyed _____ |
| 4 sagivreseg | behaving in an angry way that shows you want to fight, attack, or argue with someone _____ |
| 5 taidateg | worried or upset _____ |
| 6 vronopceautie | not willing to do what someone asks you to do _____ |
| 7 vesabui | offensive or insulting _____ |
| 8 issupicuso | that might be bad or dangerous _____ |
| 9 rkudn | unable to control your actions or behaviour because you have had too much alcohol _____ |
| 10 ryuunl | very difficult to control _____ |

2 Complete the sentences with the words in the box in the correct form. More than one answer may be possible.

abuse bite calm down handcuff harass hit kick punch remove restrain threaten

- A child was _____ the back of my seat with their feet.
- The man started to _____ a steward by repeatedly demanding whiskey.
- The passenger _____ to _____ one of the flight attendants with his shoe.
- The pilot told him to _____ otherwise they would have to _____ him.
- The drunk lady _____ another passenger in the stomach.
- As they tried to _____ the passenger she _____ one of the flight attendants' hands.
- The group were _____ the other passengers, shouting and swearing at them.
- The group were told that if they didn't control their behaviour that they would be _____ from the plane.



PAIR WORK



STUDENT A

Unit 1 – Section 3

Pronunciation (p 12)

1 Read the call signs to your partner.

1 TG104 2 NH3993 3 KX565 4 ON778 5 QV260

2 Listen to your partner and write the call signs, then check what you have both written.

Unit 2 – Section 1

Functional English (p 17)

Work with another student A. Use the words in the box to write the complete forms of the abbreviations below. Then form a pair with a Student B to find out what their abbreviations stand for.

above air approach data distance
final fix flight go ground level
outside range recorder runway
temperature to visual

AGL above ground level

DTG _____

FAF _____

FDR _____

OAT _____

RVR _____

Student B's abbreviations

FIR _____

TAS _____

TBS _____

TOGA _____

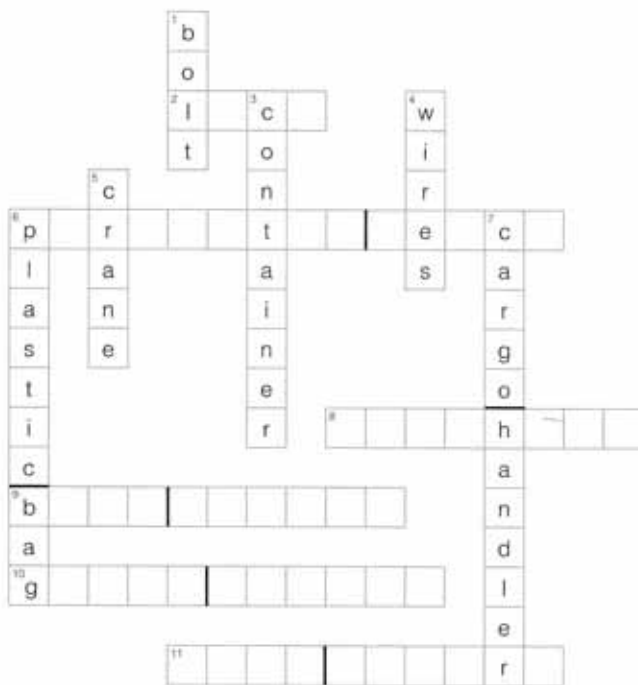
ZFW _____

ILS _____

Unit 4 – Section 2

Functional English (p 35)

Explain the words in your crossword to Student B. Explain what things are used for, but don't say the words. Ask Student B to explain their words for you.





Unit 5 – Section 2

Speaking (p 43)

Ask Student B to give you information about the CAP 232.

How long is the CAP 232? What's its height?

Use units of measurement when you say the specifications of the MX2.

It's 21.5 ft, or 6.55 m.

specifications	MX2		CAP 232	
	non-metric	metric	non-metric	metric
length	21.5	6.55		
height	6.0	1.83		
weight (unladen)	1,287	584		
wing area	102	9.5		
g-rating	+/- 14			
engine	320			
max speed / VNE	220			
stall speed / VS	58			
climb rate	3,500	1,066		
roll rate	400			
range	1,669	901		

Unit 7 – Section 1

Speaking (p 57)

You are a customs official.

As a new security measure the following rules have been introduced.

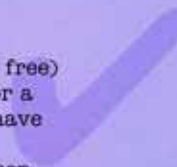
Forbidden

- Any machine with petrol
- Lighters
- Matches
- Fireworks



Allowed

- Perfume (if bought in the duty free)
- Wet cell batteries if they are for a wheelchair and the terminals have been disconnected
- Life jacket (one only) with carbon dioxide cylinder



You have to explain to a passenger what is and isn't allowed and why. Use language from the Functional English section if you can.

Unit 9 – Section 1

Functional English (p 73)

Listen to Student B's ideas about what could be happening in the pictures.

Then, without showing the pictures, describe what is actually happening.

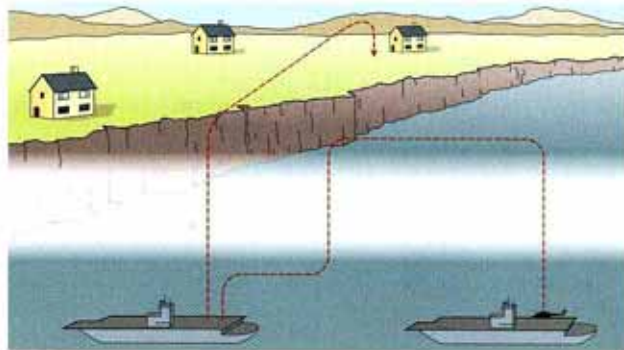




Unit 9 – Section 2

Functional English (p 74)

- 1 Describe your helicopter route to Student B. Do not show them your picture.
- 2 Listen to Student B's description of the route of their helicopter and draw it on your picture.

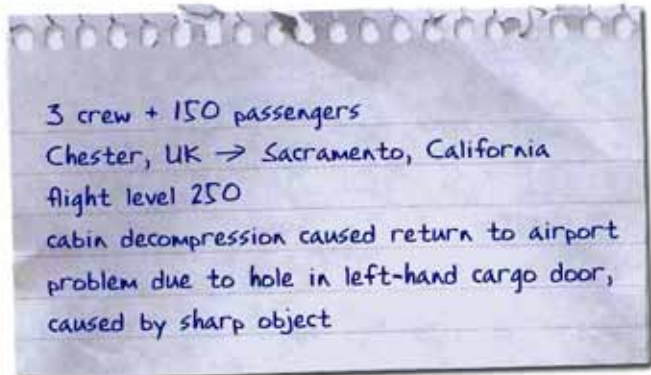


Unit 11 – Section 3

Pronunciation (p 92)

- 1 You are at a meeting reviewing emergency procedures. Listen to Student B talking from notes about an incident. You have the correct information in the report below. Correct Student B politely but clearly.
- 2 Later in the same meeting, you need to talk about another incident, but you only have notes you made at the time. Talk about the incident, making full sentences from your notes. Student B has the official report of the incident, and will correct any information that is wrong.

Crew	Pilot, co-pilot, 3 flight attendants
Passengers	121
Departure city	Liverpool, UK
Destination city	San Francisco, California
Flight level	FL 240
Problem	faulty air conditioning
Action taken	emergency landing at Manchester Airport
Outcome	decompression caused by one of the cabin doors not being closed correctly



Unit 12 – Section 2

Functional English (p 99)

- 1 Complete the table with another Student A. Use the language from the Functional English section.

passenger's behaviour	'suspicious' interpretation	likely interpretation	imaginative interpretation
A young man repeatedly touches one of his feet.	He must have a bomb in his shoe.	He's probably hurt his foot.	He could be superstitious about flying, and that's his 'lucky' shoe.
It is summer, but a middle-aged woman in departures is wearing heavy winter clothes.			
An elderly man doesn't respond to greetings.			
Two young women are travelling together, but not talking to each other.			

- 2 Each student form a pair with a Student B. Tell them only your interpretations. They must guess what the passenger's strange behaviour is.

Unit 1 – Section 2

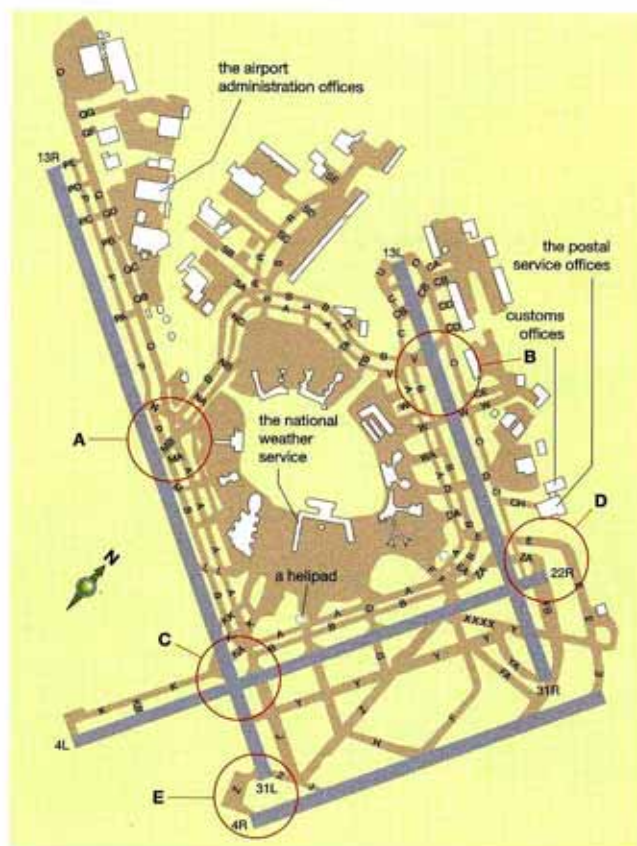
(p 10)

Find out from Student A where the following buildings and features are. Mark them on your map.

- the general aviation terminal
- the airport police station
- the aircraft rescue and fire-fighting station
- the international arrivals terminal
- the control tower
- a helipad

Describe the position of the buildings and features that Student A asks for. The prepositions in the box will be useful.

in the centre of in front of next to behind opposite
to the north of parallel to on the opposite side of



Unit 1 – Section 3

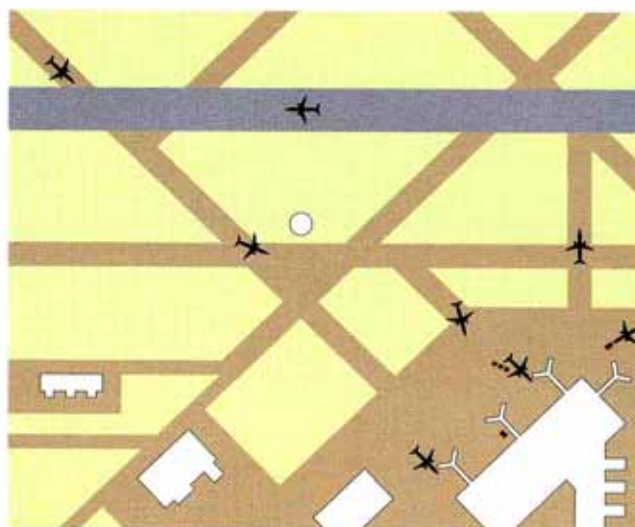
Pronunciation (p 12)

- 1 Listen to your partner and write the call signs.
- 2 Read the call signs to your partner then check what you have both written.

- | | |
|----------|---------|
| 1 AB793 | 4 EK265 |
| 2 PH4870 | 5 ZB256 |
| 3 FI190 | |

Speaking (p 13)

You and your partner have the same picture of an airfield with different things missing. Describe your airfield and listen to your partner's description of theirs. Draw anything that is missing.



Unit 2 – Section 1

Functional English (p 17)

Work with another student B. Use the words in the box to write the complete forms of the abbreviations below. Then form a pair with a Student A to find out what their abbreviations stand for.

air	around	be	flight	fuel	go	information
instrument	landing	off	region	specified	weight	zero
speed	system	take	to	true		

FIR flight information region

TAS _____

TBS _____

TOGA _____

ZFW _____

ILS _____

Student A's abbreviations

AGL _____

DTG _____

FAF _____

FDR _____

OAT _____

RVR _____



Unit 2 – Section 2

Vocabulary (p 18–19)

Ask student A what places are at the following co-ordinates. Write the names of the places in the approximate position on your map.

example

What do you have at two-nine degrees, two minutes, four-nine decimal seven-eight seconds south, one-six-seven degrees, five-seven minutes, four-two decimal nine-eight seconds east?

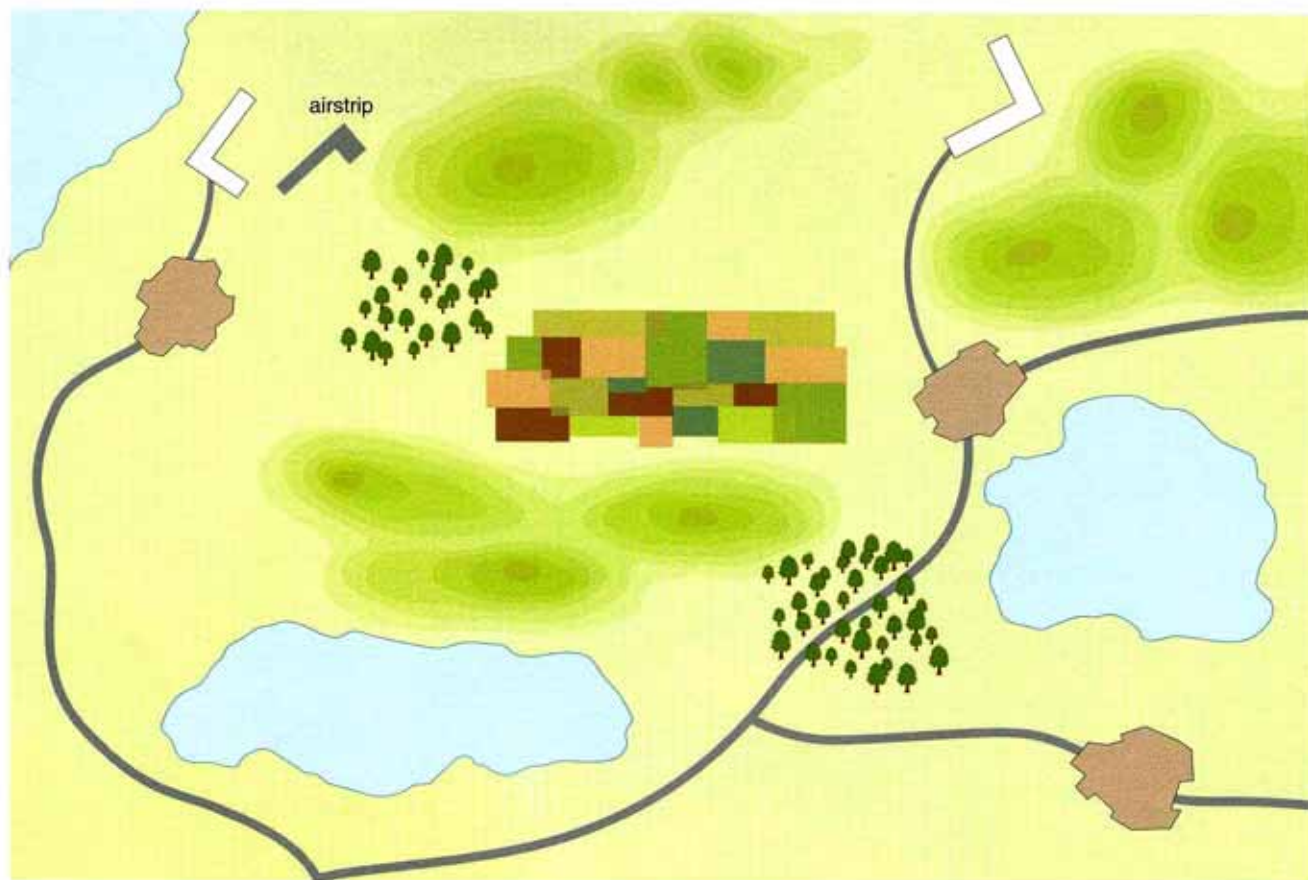
- | | | |
|---|---------------|----------------|
| 1 | 29°02'49.78"S | 167°57'42.98"E |
| 2 | 17°45'35.72"S | 177°26'39.93"E |
| 3 | 22°20'52.78"S | 171°20'43.88"E |
| 4 | 33°51'29.41"S | 151°12'37.52"E |



Unit 2 – Section 3

Speaking (p 21)

Ask Student A to describe their position using visual fixes. Direct them to the airstrip, getting them to confirm or disconfirm what they can see along the way.

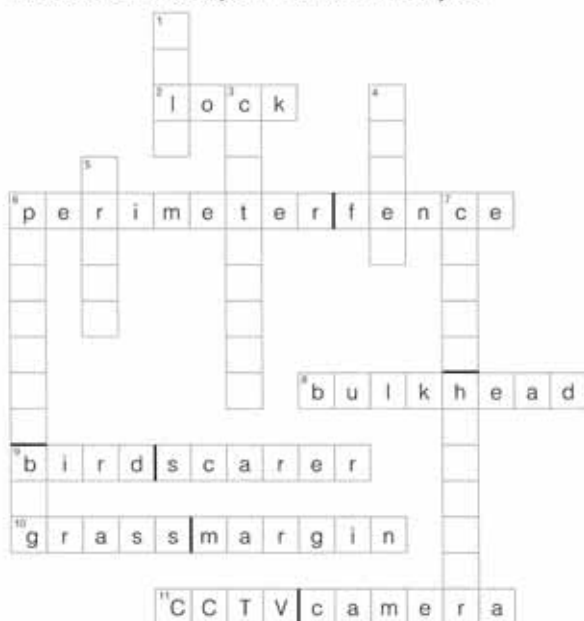




Unit 4 – Section 2

Functional English (p 35)

Explain the words in your crossword to Student A.
Explain what things are used for, but don't say the words.
Ask Student A to explain their words for you.



Unit 5 – Section 2

Speaking (p 43)

Ask Student A to give you information about the MX2.

Example

How long is the MX2? What's its height?

Use units of measurement when you say the specifications of the CAP 232.

Example

It's 22.2 ft, or 6.76 m.

specifications	MX2		CAP 232	
	non-metric	metric	non-metric	metric
length			22.2	6.76
height			5.8	1.79
weight (unladen)			1,290	586
wing area			109.2	10.1
g-rating			+/-10	
engine			300	
max speed			219	
stall speed			56	
climb rate			3,290	1,002
roll rate			420	
range			1,200	648

Unit 7 – Section 1

Speaking (p 57)

You are a passenger and want to take the following items on board. Try to get the customs officer to let you take the items on board your flight. Use language from the Functional English section if you can.

- 200 cigarettes
- a box of fireworks
- a packet of ten lighters
- perfume (bought in duty-free)
- ten packets of tea.
- two life-jackets with carbon dioxide cylinders
- two new car batteries. (You have emptied the battery acid and disconnected the terminals. The passenger in front of you has an electric wheel chair which contains a disconnected battery. He is allowed to take it with him.)

Unit 9 – Section 1

Functional English (p 73)

- 1 Listen to Student A's ideas about what could be happening in the pictures. Then, without showing the pictures, describe what is actually happening.



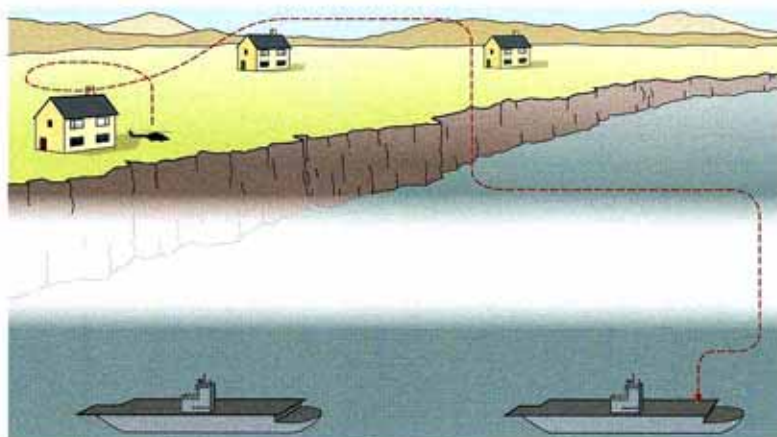
- 2 Change roles. Look at the Student B pictures on p 73.



Unit 9 – Section 2

Functional English (page 74)

- 1 Listen to Student A's description of the route of their helicopter and draw it on your picture.
- 2 Describe your helicopter route to Student A. Do not show them your picture.



Unit 9 – Section 3

Functional English (p 77)

1 Flight SQ286 taxied to runway 05R at Auckland's International Airport and was cleared for take-off. When the captain rotated the B747-412 for lift-off, the tail struck the runway and scraped for 490 m until the aeroplane became airborne. The tail strike occurred because the rotation speed was 33 kt less than the 163 kt required for the aeroplane's weight.

2 The controller cleared Flight 504 for a visual approach to runway 15. At 19:54 the crew reported on finals and were cleared to land. The F-28 touched down 4.5 m short of runway 15 and struck the edge of the runway threshold. It continued for 112 m before coming off the runway. It ran another 263 m before it skidded into another aircraft and stopped.

3 Flight 1655, a B737-300, was vectored for a visual approach to runway 8. The flight's descent angle was more than 6°. Touchdown speed was 182 kt. The crew couldn't stop the aircraft on the runway and it overran. It crashed through the perimeter fence at a speed of 42 kt and stopped on a highway. The forward service door-escape slide inflated inside the plane and the nose gear collapsed.

Unit 10 – Section 3

Speaking (p 85)

- 1 You are a student pilot on a solo flight in a Cessna 172SP. Your partner is the flight instructor on the ground. You have fuel problems and engine power loss. You can't remember all of the manual's checklist for this situation. You have radio communications. Your instructor will tell you the correct readings and control settings for power loss. Check them against your control settings in the picture, and find out what mistakes you have made. Use language from the Functional English section.
- 2 Change roles. You are a flight instructor on the ground. Your partner is a student pilot on a solo flight in a Cessna 172SP. He/She has fuel problems and is going to make a power-off landing. He/She can't remember all of the checklist and is busy trying to fly the aircraft. You have radio communications. Go through the checklist below. Find out what mistakes he/she has made and correct them.

POWER OFF LANDING

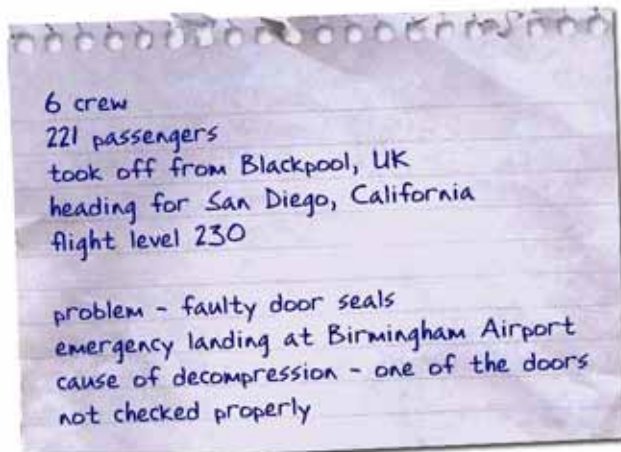
air speed	= 68 KIAS
transponder code	= 7700
mixture	= IDLE CUT-OFF (= fully out)
fuel shut-off valve	= OFF (= fully out)
ignition switch	= OFF
flaps	= 30 or FULL



Unit 11 – Section 3

Pronunciation (p 92)

- At a meeting reviewing emergency procedures, you need to talk about an incident that happened, but you only have notes you made at the time. Talk about the incident, making full sentences from your notes. Student A has the official report of the incident, and will correct any information that is wrong.
- Later in the same meeting, you listen to Student A talking from notes about an incident. You have the correct information in the report below. Correct Student A politely but clearly.



Incident report

Crew	Pilot, co-pilot, 2 flight attendants
Passengers	115
Departure city	Manchester, UK
Destination city	Oakland, California
Flight level	FL 260
Problem	cabin decompression
Action taken	returned to Manchester Airport
Outcome	Decompression was caused by a small hole in the right-hand cargo door. The hole was probably created by a ramp vehicle at Manchester Airport.



Unit 12 – Section 2

Functional English (p 99)

1 Complete the table with another Student B. Use the language from the Functional English section.

passenger's behaviour	'suspicious' interpretation	likely interpretation	imaginative interpretation
An elderly woman is holding her handbag very close to her body.	<i>She might be hiding a weapon.</i>	<i>She is probably afraid of losing her medication.</i>	<i>She may have an old photo of her dead husband and doesn't want to lose it.</i>
A teenage boy cannot walk straight.			
A middle-aged businessman refuses to part with his umbrella.			
A young man is wearing a rucksack with wires coming from it.			

2 Each student form a pair with a Student A. Tell them only your interpretations. They must guess what the passenger's strange behaviour is.

Unit 9 – Section 3

Functional English (p 77)

- Flight SQ286 taxied to runway 05L at Auckland's International Airport and was cleared for take-off. When the captain rotated the B747-412 for lift-off, the tail struck the runway and scraped for 490 ft until the aeroplane became airborne. The tail strike occurred because the rotation speed was 33 kt less than the 163 kt required for the aeroplane's weight.
- The controller cleared Flight 504 for a visual approach to runway 15. At 09:54 the crew reported on finals and were cleared to land. The F-28 touched down 4.5 m short of runway 15 and struck the edge of the runway threshold. It continued for 212 m before coming off the runway. It ran another 263 m before it skidded into the wall of a building and stopped.
- Flight 1455, a B737-300, was vectored for a visual approach to runway 18. The flight's descent angle was more than 6°. Touchdown speed was 182 kt. The crew couldn't stop the aircraft on the runway and it overran. It crashed through the perimeter fence at a speed of 32 kt and stopped on a highway. The forward service-door escape slide inflated outside the plane and the nose gear collapsed.

LISTENING SCRIPT

Unit 1

01

Our first hotspot is taxiway E as we approach from taxiway C en route to runway 22R. The signage is confusing, and a blast fence blocks the view of the end of the runway. Aircraft taxiing to 22R via C often turn left too soon and end up on taxiway E. This can mean a very long taxi behind 22R.

02

A second problem area is taxiway Z crossing runway 13R / 31L. A right turn is required when crossing 13R to taxiway Z on the opposite side. There are two taxi lines leading across. If you follow the wrong one, you could end up with a conflict with arrival traffic on runway 13R. In this situation, advise ATC immediately and get off the runway as quickly as possible.

03

A third area of concern is using Juliet to transition from A to B south-eastbound. Aircraft outbound from K and KK may sometimes be issued the instruction 'Taxi left A. At J, transition to B.' It's very important not to miss the turn onto B, because J leads across runway 22R.

04

Quebec
Romeo
Zulu
November
Hotel
Juliet
Sierra
Alpha

05

C = controller, P = pilot

- C** MC798, say your position.
P We're clear of the runway on ... er ... N by B, MC798.
C MC798, thank you. Taxi to the ramp via taxiways N and T. Report crossing runway 16.
P Roger. N, T and report crossing 16, MC798.
MC798 is on N by the runways here ... er ... we

can't see much because it's so foggy. Are we cleared to cross straight ahead on N?

- C** MC798, cross runway 16. Join taxiway NT on the opposite side.
P NT on the opposite side. We're approaching Kilo here ... oh ... There's somebody taking off!
C MC798, you shouldn't be near K. Hold your position!
P Tower, this is MC798. We are on a runway. I'm currently looking to the right at K. We are on 23R at the intersection of 16. We did not connect on N. We are by K. K is to our right. We're on an active runway. MC798.
C MC798, 23R is not an active runway.
P Er ... I'm sorry, Ma'am. We're on 23L and 16, and I am facing K. I'm looking out the window and I can see a sign that says '23L' to my right, and there is a sign saying '16' to my left and a yellow sign saying 'K' to my right, and another sign to my left.
C MC798. Just go straight ahead. Tell me when you get to the next sign please.
P OK, we're now on 23L. We are approaching K now.
C MC798. Roger. Turn right at K and make a slight left turn onto taxiway C. Hold short of runway 23R.
P We're on K and we're clear of the runway. We're approaching C on K.

06

- 1 FR396
- 2 AQ629
- 3 CZ310
- 4 LN588
- 5 HY5571
- 6 JM422

Unit 2

07

P = Prochnow, C = controller, V = Vette

- P** MAYDAY. MAYDAY. MAYDAY. Auckland Control. N45AC. I'm lost. I'm a Cessna 188 AgWagon.
C N45AC. Auckland Centre roger mayday.
V TE103 contacting N45AC.
P N45AC. Copy.



- V** N45AC. We are a DC-10 en route from Fiji to New Zealand. We received news of your situation. We are offering assistance. Can you tell me what happened?
- P** TE103. Thanks. Departed Pago Pago at three this morning with around 22 hours endurance. I wanted to have enough light to see my fixes. But the ADF stopped working correctly, and now unable to calculate my position. N45AC.
- V** N45AC. We are going to try to establish VHF communication with you.

08

- Turn towards the sun and report your heading.
- P** Wilco. My heading is 274°.
- V** N45AC. We are facing the sun. Our heading is 270. The difference is 4°, so you are south of our position. Now hold out your hand. How many fingers do you have between the horizon and the sun?
- P** About two and a half fingers.
- V** N45AC. We have *four* fingers, so you are south-west of our position. Fly heading 315.
- P** Heading 315.
- V** N45AC. Maintain your position, so we can establish your position using the radio signal. We'll maintain our heading until we lose contact. Then we will turn left to re-establish contact, and then try to box you in this way. We'll contact you again very soon. N45AC. It's getting dark. What time is your sunset?
- P** The sun is setting now, and it is 0752 zulu.

09

- V** N45AC. Sunset on Norfolk Island is 0730 zulu. That means you are 5.6° east and 30° south of Norfolk Island. Maintain your heading.
- P** TE103. I can see a light. I think it's an oil rig.
- V** N45AC. Your co-ordinates are 31° south, 170° 21' east. You are 150 miles from Norfolk Island.

10

north	south	east	west	south-east
north-west	south-west	north-east		
274°	56° east	32° south	170°21'	
east	14°32'40.25" north			

11

- /d/ We received news of your situation.
- /t/ The ADF stopped working correctly.
- /d/ I wanted to have enough light to see my fixes.

12

- | | | |
|-------------------|------------|------------|
| 1 /d/ followed | arrived | tried |
| 2 /t/ established | approached | tasked |
| 3 /d/ contacted | departed | calculated |

13

P = pilot, C = controller

- P** MAYDAY, MAYDAY, MAYDAY. TJB.
- C** TJB. Pass your message.
- P** MAYDAY, MAYDAY, MAYDAY. We're lost.
- C** TJB. Say last known position.
- P** Last known position was 15 miles south-east of CELRA VOR. TJB.
- C** TJB. Roger, last known position 15 miles south-east of CELRA VOR. Remain straight and level.
- P** I'm straight and level right now. We're in total IMC. I can't see the ground.
- C** TJB. Squawk 7700 on your transponder sir.
- P** Squawking 7700. TJB.
- C** TJB. I don't have you on my screen. Can you confirm your aircraft type, altitude and speed?
- P** We're in a Beech Baron. Altitude 3,000. Speed 110. TJB.
- C** TJB. Please state fuel on board and persons on board.
- P** I have 780 lb of fuel, and eight persons on board. Endurance is approximately one hour and 30 minutes ... I can see the ground now. I can see trees, and I can make out ... high ground on each side of the aircraft ...

14

- C** TJB. Can you fly into VFR?
- P** Affirm ... I can see high ground to the north. I'm flying up a valley, with woods to the north, and fields below me. There is a road below me.
- C** TJB. Confirm that you can see a road.
- P** Affirm. I can see a road.
- C** TJB. What side of the valley is the road on?
- P** The highway is to my right, on the south side of the valley.
- C** TJB. Can you make out a river?
- P** Affirm. There is a river.
- C** TJB. Is the river on the north side of the road?
- P** Affirm. The river is ... no ... the road is crossing the river. The river is now on the south side of the road?
- C** TJB. Can you clarify that the road crossed the river and is now on the south side of the road?
- P** Negative. The road is now on the *north* side of the river. The road is now turning south-east ... there's a reservoir below me now.
- C** TJB. Can you see a communications mast at 12 o'clock, at about 4 miles?
- P** Affirm. There is a communications mast at 12 o'clock.
- C** TJB. Turn hard left and make a 180° turn, heading 265. Expedite.
- P** Making 180° left turn, heading 265. TJB. I'm coming out of the valley and I can see a built-up area ahead and a lake at one o'clock. TJB.
- C** TJB. There is an airport with a tower 5 miles north-west. Say intentions.
- P** I'd like to land. Can you give me vectors?

Unit 3

15

J = Jean – airline employee, M = Mehmet – pilot

- J** Mehmet ... can I have a word?
M Sure, Jean. How can I help you?
J Well, you know the airline is upgrading the fleet ... I was wondering – what's your opinion on the two options.
M They're looking at the Boeing 777 and the Airbus A320, aren't they?
J That's right.
M Well both of them are very sophisticated vehicles – they both use fly-by-wire technology.
J Sorry Mehmet – can you just explain what 'fly-by-wire' means?
M In a fly-by-wire aircraft, the pilot manoeuvres the aircraft by operating a computer. But in a conventional aircraft, the pilot uses a control column that is physically linked to the control surfaces.
J So if the A320 and 777 are both fly-by-wire, what's the difference?
M The 777 has an override function.
J I'm not sure what you mean by 'an override function'.
M OK – it's a system that allows the pilot to ignore the built-in limits.
J OK.
M On the other hand, the A320 has built-in protection.
J What do you mean?
M In other words, the Airbus computer doesn't allow pilots to do anything dangerous. There are limits on the Airbus to increase safety.
J So basically, on an Airbus the computer has ultimate control, and on the Boeing 777 the pilot decides.
M That's correct.
J Can you give me an example?
M For example, computers stop the pilot climbing more than 30°, so that the plane doesn't stall. And there are protections to prevent overspeed. That is, it stops the pilot from going faster than is safe.
J So that makes it safer, right?
M Well, in my opinion, when you fully automate and protect the system, you reduce the pilot's capability. To put it another way, sometimes the aircraft should allow manual control. I mean, you shouldn't limit the pull-up capability, for example to miss another plane or the ground. At the Habsheim airshow for example, built-in protection didn't allow the pilot to pull up, and the plane crashed. But sometimes built-in protection can prevent an accident ... a Boeing 757 hit a mountain in Colombia because the crew didn't

retract the speed brakes as they climbed. The speed brakes on an A320 retract automatically.

J It seems that there are good arguments on both sides.

M Well yes – they're both extremely safe.

16

- 1 port
- 2 bat
- 3 tab
- 4 pet
- 5 lap
- 6 beg
- 7 staple
- 8 bit

17

PNF = pilot non-flying, C = controller, PF = pilot flying

- PNF** Brest, M246. Request descent.
C M246. Cleared, descend FL 150.
PF What the ...? The lights have gone. And we've lost the autopilot ... and autothrust. I have manual control.
PNF The engines sound OK. The primary flight displays have gone.
PF I can't see the standby horizon, but I can just make out the horizon outside. I've got control of the attitude. Call Centre and tell them what's happening. Declare an emergency and tell them what's happened.
PNF MAYDAY, MAYDAY, MAYDAY. M246. We have a system failure – our lights are not working and our displays are down.
 I don't think they're receiving us because the radio's lost its power.
PF OK let's try to get the system going again.
PNF So, if I shine my flashlight on the ECAM ... that's better.
PF Try rebooting the system.
PNF The instructions are on the lower screen.
PF I've got control and communications. Follow the instructions step by step.
PNF OK, I can only access the instructions one at a time.
PF First, read the instruction. Then follow it. Check it before you delete it.
PNF OK, so ... instruction number one says ...
 ... Number eight didn't help.
PF What's the next instruction?
PNF So ... let's try number nine ... Ah! The system's back on line. We've got power.
PF Right. First, try to contact ATC so they know our situation. Ask for a holding pattern. Then we can try to see what went wrong.





18

- 1 Call Centre and tell them what's happening.
- 2 Try rebooting the system.
- 3 First, read the instruction. Then follow it. Check it before you delete it.
- 4 What's the next instruction?
- 5 First, try to contact ATC so they know our situation.

Unit 4

19

P1 = pilot 1, P2 = pilot 2, G1 / G2 = ground 2

- P1** OK, that's the pre-flight checklist finished. Is the cargo nearly ready?
- P2** Yes, the containers for the next leg are loaded. I think the ground handlers are with the fork-lift truck unloading the animals now. I'll go and check on progress.
- P1** OK. We need to push back in twenty minutes really, at five past one. I don't want to miss our slot.
- P2** Hey, how's it going down here? Nearly ready?
- G1** We've got a problem in the aft hold! A cage door is damaged, and one of the lions is breaking out of its cage!
- P2** Is everyone OK?
- G1** Yes, everybody's safe – we got out quickly and closed the door behind us. What should we do?
- P2** I'd rather know what's going on in there before I make any decisions. This is what I'd like you to do – open the door quickly, assess the situation, and close it again.
- G1** Well ... OK. There he is. He's halfway out.
- G2** Look – the cage lock's broken off. And also the thing that holds the door onto the cage is broken.
- G1** The hinge? Yes, that's broken too. So, we've got a cargo net for catching him, but someone's got to get in and throw it over him.
- P2** Look, I don't want anyone to put themselves in danger. I'd prefer to get some help with this. We need a vet.
- G1** I agree. Oh no – he's out. Close the door again, quick!

20

- 1 I don't want to miss our slot.
- 2 I'd rather know what's going on in there before I make any decisions.
- 3 This is what I'd like you to do ...
- 4 I don't want anyone to put themselves in danger.
- 5 I'd prefer to get some help with this.

21

- 1 This is going to make us late.
- 2 We've got a problem in the hold.
- 3 What do you think we should do?

22

PNF = pilot non-flying, C = tower, PF = pilot flying

- C** S27H. Contact departure 121.75. Good day sir.
- PNF** Contact departure 121.75 S27H thank you
- PF** After take-off checklist.
- PNF** After take-off checklist, complete.
- PF** What was that?
- PNF** What?
- PF** That noise?
- PNF** Oh! The windshield!

23

- PF** That's a multiple strike!
- PNF** That was four birds!
- Engine number one is still running.
- PF** Where's the power? We're rolling left.
- PNF** There's no data on the screen for engine number one.
- PF** We need to get wings level. Increase thrust on number one.
- PNF** Increasing thrust.
- PF** OK, wings level.
- PNF** The engine's not running properly.
- PF** It's hard to remain level. Help me.
- PNF** Any power on number one?
- PF** I don't know. I can't see any power at all. The displays read nothing. I think we need to shut it down. I intend to shut down number one.
- PNF** OK, shut down number one.
- PF** Shutting down number one.
- PNF** More power on two and three.
- Increasing power on two and three.
- PF** OK. Can you clean the windshield? Get those wipers on.
- PNF** Wipers on.
- C** S27H Moi Tower. We see flames and smoke from your left engine. Is everything OK?
- PNF** No, a bird has gone into the engine. We hit lots of birds at 1,800. We've lost number one engine. S27H.
- C** S27H. Your number one engine has ingested birds. Are you declaring an emergency?
- PNF** Declaring an emergency. We're planning on coming back. S27H.
- C** S27H. State persons on board.
- PNF** Three crew members.
- C** S27H. State fuel on board.
- PNF** Er ... 194,000 kg.
- PF** Holding wings level is difficult.

24

- C** S27H. Say intentions.
- PNF** What are we going to do? Go around to the left?
- PF** Yes. I don't intend to land with this much fuel on board. Turn left, dump fuel and get back down.
- PNF** We're going to make a left orbit of the airfield. S27H.



- C** S27H. Can you make right turns?
PNF Negative, sir. Right turns will be very hard. I'd prefer to turn left.
C S27H. Understand you are unable to make right turns. Turn left at your discretion.
PF OK, we need to dump fuel as soon as possible.
PNF We plan to dump fuel to landing weight. S27H.

180° to a nose-down attitude. But this time the aileron didn't release properly, and I almost went into a spin and crashed. Luckily, I got control, and when I landed, I checked the control systems and found a leak in the hydraulic lines.

- I** And how are you feeling about the air race today?
T I've done a lot of training, and I'm feeling positive.
I Well, good luck, and thanks for talking to us.
T My pleasure. Thank you.

Unit 5

25

I = interviewer, T = Thiago

- I** Welcome back to Radio Action. I'm here with champion air-race pilot, Thiago Silvo Corbera. Now, Thiago, can you tell us a little about aerobatic manoeuvres?
T The two basic manoeuvres are the loop, which is where you fly a vertical circle. You can fly an inside loop, where you pitch up into a circle, or an outside loop where you pitch down into a circle. And there's the roll, either a half roll – where the wings turn 180° to inverted flight so that you fly upside-down, or a full roll, where you rotate 360°.
I And what about the more complex manoeuvres?
T The barrel roll is where you complete one loop and one roll at the same time, making a flight path similar to a horizontal corkscrew, like when you open a bottle of wine. A more complex manoeuvre is the Cuban eight, which again is a combination of loops and rolls. This manoeuvre makes a shape like a number eight. My favourite manoeuvre is the tail slide. That's a straight vertical climb up until you lose momentum. You then fall backwards, tail first, until the nose drops through the horizon to a vertical down position, and then you drop back into level flight. Moves like this are fun, but the most important thing in an air race competition is completing the course as fast as you can.
I What aeroplane are you flying today?
T I'm flying an Extra 300s.
I And how is this different from normal aircraft?
T Well, they are quite different in that they are much lighter than normal aircraft and they have more power for their weight. This aircraft only weighs 672 kg but it has a 300 HP engine. Another key difference is that the control surfaces, the ailerons, rudder and elevators, deflect at least 25°, which is much more deflection than conventional aircraft. This is so you can make the hard manoeuvres at high speed.
I Do you ever get scared?
T The scariest moment I've ever had was doing a manoeuvre called the hammerhead. You start by flying vertically, but then slow down and apply full rudder and full opposite aileron. You then yaw

26

feet
 metres
 square feet
 kilometres
 feet per minute
 degrees per second
 knots
 gs
 nautical miles
 square metres
 pounds
 kilos OR kilograms
 horsepower
 metres per minute

27

The Extra 300s has a length of 22.6 ft or 6.9 m, a height of 8.5 ft – or 2.6 m – and an unladen weight of 1,480 lb – or 672 kg. The combined wing area is 98 ft² – or 9.1 m². The Extra 300s has a g-rating of +/-10 gs, and has a Lycoming 6-cylinder power plant which produces 300 HP, giving a VNE speed of 220 kt. Its stall speed is 60 kt. The aircraft can climb at a rate of 3,200 ft – or 975 m – per minute and roll at a rate of 400° per second. Its range is approximately 944 km – or 510 nm.

28

- 1 six point five one
- 2 six hundred and fifty-one
- 3 six thousand, five hundred and one

29

P = pilot, C = controller

- P** Approach. Executive 56. We're having trouble controlling the attitude. It's difficult to establish level flight. Declaring an emergency. Executive 56.
C Executive 56, roger your emergency. State intentions.
P We'd ... er ... like to come back to your airport but we are still trying to fight the pitch and bank. We've got low hydraulic pressure and we've got very little deflection on the elevator or ailerons. Executive 56.
C Executive 56. Just tell me what you need and I'll get it for you.



- P** It's very difficult to pull or turn on the column ... er... we're using asymmetrical thrust ... er... we're using the engines to turn. We can only make big turns. Executive 56.
- C** Executive 56. Roger. Big turns only. Manoeuvre at your discretion.
- P** We're going to go out west and then make a straight in approach if that's possible. We're fighting to keep it straight and level. We will need a very long final. I don't think we have spoilers, reverse thrust or brakes, so we'd like the longest runway possible. Executive 56.

30

- C** Executive 56. OK, a visual on runway 07. Would you like emergency assistance at the far end of the runway?
- P** Affirm, Executive 56.
- C** Executive 56. The services have been activated. Do you want me to line you up with the end of the runway right now?
- P** Yes please, but we're really struggling to follow a heading. Please keep giving us vectors to the field. Executive 56.
- C** Executive 56. Roger. Turn left heading 050°.
- P** 050. We're adopting landing configuration now to slow us down. Executive 56.
- C** Roger. Executive 56.
- P** We have flaps and ... er ... and landing gear is down and control is easier now. We have the field in sight.
- C** Executive 56. Roger. You are cleared to land runway 07. Wind 170 with 26 kt.

31

- P** Approach, we're down safely, but we overran the runway Executive 56.
- C** Executive 56. Glad you're all OK. Is there anything else you need?
- P** We'll need help getting back to the apron. Executive 56
- C** Executive 56. Roger. You're off the end of the runway. We'll get a tow truck to take you back.

32

- 1 We're having trouble controlling the attitude.
- 2 It's difficult to establish level flight.
- 3 Just tell me what you need and I'll get it for you.
- 4 We're fighting to keep it straight and level.
- 5 Would you like emergency assistance at the far end of the runway?
- 6 Do you want me to line you up with the end of the runway right now?
- 7 We're really struggling to follow a heading.
- 8 Is there anything else you need?

Unit 6

33

P = presenter, A = Antonio, G = Greta, Y = Yacine

- P** So, what does everyone think about this – is it possible to separate your personal life from your work life? Yes, Antonio ...
- A** I don't think it is. For example, I heard recently about a senior captain who had just signed on for a three-day pattern of flying after spending three days off duty at home. After take-off he heard 'gear up' called but he retracted the *flaps* by mistake. Anyway, they found out afterwards that he was worried about money, and that his baby son had kept him awake, and so he was exhausted and unfocused at work.
- P** Well that illustrates how personal worries can affect performance. Things like a relationship breakdown or financial difficulties can cause stress which can impact work. So what can people do to help them cope with stress?
- A** Try and identify the sources of stress. Some experts suggest keeping a diary to record what events affect your energy and time. For some people there might be something specific that triggers anger or anxiety, or they might just feel overworked.
- P** So how can you avoid getting really run down?
- Y** You should try to take holidays from work regularly. Organize your schedule around them. And take regular breaks while you're working too.
- G** When you're starting to feel a bit down, I think it can help to talk to a friend about your problems and feelings.
- A** But if the cause of stress is outside of your control, you may want to get professional help on how to deal with it. Some companies provide counselling for employees.
- Y** For me, the best way of dealing with stress is to make sure you exercise, eat and sleep well. And if you can't sleep, well, then I suggest you see your doctor.
- G** Oh ... Another good idea is to try and make more time for those things you enjoy. Take regular opportunities to relax. I would advise a stressed friend or colleague to try some stress-reducing techniques such as meditation or a massage.
- P** That's great. I think you've come up with some really good ways of coping with stress. Now ...

34

stress
pressure
spending
flaps
flight
breakdown
specific
plans



35

- 1 We're still struggling to get a slot.
- 2 The brake light is blinking.
- 3 Is the runway dry enough to drive on?
- 4 The flaps are frozen and need freeing.
- 5 I'll wipe the grease off the glass.
- 6 I've tried to fix the trouble twice.
- 7 There's a threat of strikes throughout the country.

36

CPT = captain, C = controller, M = medical advisor, F = first officer

CPT Cairo Centre, this is Divestream 290.

C Divestream 290 Cairo Centre. Pass your message.

CPT We have a medical situation on board. We are contacting MedLink now. Divestream 290.

C Roger, you have a medical problem on board. Keep us advised. Cairo Centre.

M MedLink. I'm Dr Slowinski. Which flight are you calling from please?

F This is Divestream flight 290 and this is Moustaf, the first officer.

M Thanks Moustaf. How can I help you?

F We have a passenger, a young man from Belgium. He's having difficulty breathing, he's shaking badly, and his eyes are shut.

M How old is the man?

F He's in his late twenties.

M Is he able to communicate?

F No. I don't think he can hear anyone. He's crying in pain.

M OK, you should move the other passengers away from the patient, if possible.

F Luckily his seat is to the rear of the aircraft, so we've already moved the other passengers away.

M Good. Have you removed his seat belt?

F Yes, we have. We've laid him down on the floor.

M That's good. Where has he been?

F From his passport, it looks like he has been on holiday in Egypt for ten days.

M Have you found any other information about him?

F No, we haven't found anything else yet. We're looking through his belongings.

M Has he eaten or drunk anything?

F No, the crew haven't begun to serve drinks yet.

M I see you are travelling to Paris CGD. How long have you been airborne?

F We've been in the air for about 15 minutes.

M So you're still climbing. Are you climbing rapidly?

F Yes we are. ATC asked for a steep climb out of Cairo due to traffic.

FA Moustaf, he has just started coughing blood, and we think he is losing consciousness.

F Oh dear ...

FA I've just looked in his hand luggage. I found a hotel receipt, a wallet and a scuba-diving log book. It looks like he dived this morning.

M Did I just hear that the patient dived this morning?

F Er ... yes.

M OK, this sounds like it is a case of decompression sickness, which is a critical condition. You should stop climbing and descend right away if you can – every foot you climb could seriously affect the patient's health. You should divert and find an alternate airport that has medical services. Try asking ATC to help you find an alternate that is close to a decompression chamber. There should be a diving decompression chamber somewhere on the Red Sea.

F Roger, levelling off and initiating descent ...

37

- 1 We've already moved the other passengers away.
- 2 Have you removed his seat belt?
- 3 We haven't found anything else yet.
- 4 Has he eaten or drunk anything?
- 5 I've just looked in his hand luggage.

38

He's having difficulty breathing, he's shaking badly, and his eyes are shut.

39

- 1 Nausea, dizziness, losing consciousness and sweating.
- 2 She's trembling, coughing and crying.
- 3 Lie the passenger down, put him in recovery position and call Medlink.

Unit 7

01

Most passengers know what they can and can't bring into an airport. It's obvious that you mustn't bring anything explosive on board. Although some people still try, even when they know it's illegal. The owner of the black powder knew he wasn't allowed to transport it without declaring it as dangerous goods. You have to declare dangerous goods or you are breaking the law. Less than one percent of cargo incidents reported involve dangerous goods which have been correctly declared. It's difficult to understand for example how someone let chemical solutions and corrosive solids on board without question just because they were labelled as 'laundry products'. Maybe better dangerous goods training is required.



02

PA = voice over public address R = radio presenter, S = smoke-jumper, O = operations manager, P = pilot

PA All jumpers. We have a 1 km² fire 82 km south-west. Get suited. Get your full kit. Line up for inspection. We have a 43 departure.

R It's a hot summer's day in the far east of Russia, and I'm on my way to a wild fire. I'm here with the aerial fire service, who fight the many fires that burn through the forests of northern Asia. Andrei Jachmenkov is a smoke-jumper. Andrei – Could you describe your work to us?

S I jump to the ground to bring the fires under control. It's dangerous work – you have to be fit, both mentally and physically. And you have to keep a cool head and make fast decisions.

R The fire service looks after hundreds of square kilometers from the Arctic to the borders of Mongolia. When the office receives a report of smoke, they scramble an airborne fire-fighting team. At least four smoke-jumpers are dropped to cut away the vegetation to contain the fire, and air-tanker pilots tackle the blaze by spraying the area with water or fire-retardant liquid. I have here operations manager, Alex Letov. Alex – Would you tell us how fires are caused?

O Sometimes the fires are started by people. For example, this spring an industrial gas tank exploded, causing a serious wild fire. But our typical fires are ignited by lightning storms, and because the forest gets very dry over the summer, the trees catch fire easily and fires can spread over a large area quickly. But September and October is definitely our busiest time of year, before the winter rain and snow arrives. We have to respond early to the fire, when it's much more manageable ... much easier to put out.

R Tatyana Dubrova flies an Antonov 2 for the fire service.

P When that siren goes ... that's when the job really begins. I have to try to get a low altitude and air speed for the jumpers, and all the time think of the terrain, the trees, the wind. I sometimes have to make two or three traffic circuits to make a safe drop.

R The jumpers are getting ready to drop into the forest. Andrei – Can you talk about your work on the ground?

S We have to make absolutely sure the fire has gone out. Extinguishing it completely can take days. The most difficult part is finding a road so you can get out of the forest again.
OK, here we go ...

P Jumpers, don't talk. Get ready ... drop zone!
Jump! Go! One! Two! Jumpers away ...

03

- 1 Get your full kit.
- 2 Line up for inspection.
- 3 Could you describe your work to us?
- 4 Would you tell us how fires are caused?
- 5 Can you talk about your work on the ground?
- 6 Jumpers, don't talk. Get ready ... drop zone!

04

C = controller, PF = pilot flying, PNF = pilot non-flying, CCM = cabin crew manager

C Siberian 3A, Kunming Centre, maintain FL 380 mach .85.

PNF Maintain FL 380 mach .85. Siberian 3A.

05

PF What was that? This isn't right.

PNF What's happened?

PF Three circuit-breakers have tripped. They're showing a problem.

PNF Where's the problem?

PF In one of the washrooms. Maybe the fan overheated.

PNF I'll ask the cabin crew manager to look into it.

PF I'll try and reset the circuit-breakers.

PNF OK?

CCM Yes, hi, I'm getting reports of an unpleasant smell back here, coming from the rear washrooms, like an electrical burning smell. Some of the passengers are getting a little uncomfortable with it.

PNF Could you move the passengers away?

CCM Sure, will do.

PNF Go have a look

CCM I'll check it out now.

PF Why didn't it set off the smoke detector? I'm not happy with this at all. Something's wrong.

CCM There was smouldering in the washroom. I don't know if any wiring has come loose. I sprayed it with the extinguisher – I think it's gone out.

PNF What do you think caused it?

CCM I don't know. Maybe the vacuum outlet overloaded. I couldn't see where it was coming from. I'll go back now and double check.

PF Yeah, go. We need to know the source of the fire.

CCM I'll take my goggles, just in case.

PF Yeah, We'll put our masks on. Go back, but don't get yourself incapacitated.

06

CCM I can't get back there.

PNF Why not?

CCM The smoke's too heavy.

PNF Are the passengers OK?

CCM People are starting to have trouble breathing.

PNF We have to go down.

PF Initiating an emergency descent.



07

- 1 right
- 2 flight
- 3 frame
- 4 long
- 5 load
- 6 arrive

Unit 8

08

The weather here is very changeable. Winters can be overcast with drizzle but summers can be clear and warm. As a result of the warm Atlantic winds, the temperature remains quite high – it rarely snows and is never very icy. Aircraft usually depart on the south-west heading due to prevailing south-westerly winds. The airport operator has just resurfaced the runway, and because of this sometimes there can be standing water and it can be slippery. Pilots using the airport at Bristol should be careful of this.

The weather here is quite predictable from season to season as we are in the middle of the continent. In winter there is cold weather and snow and the wind is northerly, from the Arctic. But the problems come in the summer months, when different pressure zones can cause very hot, sticky and humid conditions one moment, and then severe thunderstorms the next. This leads to quite long delays as aircraft have to enter holding patterns and wait to be vectored in to land. Approaches to the airfield can be quite rough, particularly for smaller aircraft.

Winter is quite mild this far south – the problems come for us in early summer. In the summer rainy season, the monsoon results in heavy rain and high humidity at Kerala aerodrome, with strong south-westerly winds. It can therefore be difficult to predict the heavy rains, and flooding can happen at any time. It's quite common for parts of the airfield to flood, and we have to close the airport for days when the rain is heavy. As a consequence, pilots need to be careful just before the monsoon.

09

- 1 As a result of the warm Atlantic winds, the temperature remains quite high.
- 2 Aircraft usually depart on the south-west heading due to prevailing south-westerly winds.
- 3 The airport operator has just resurfaced the runway, and because of this sometimes there can be standing water.
- 4 This leads to quite long delays as aircraft have to enter holding patterns.
- 5 It can therefore be difficult to predict the heavy rains, and flooding can happen at any time.
- 6 As a consequence, pilots need to be careful just before the monsoon.

10

ASS = ATC shift supervisor, ATC 1/2 = air traffic controllers 1/2

ASS OK everyone. We've got a severe weather front coming at us on tonight's shift. We have a big storm coming in from the north with strong westerly winds and gales, hail and heavy snow. All of the control positions are going to be affected.

ATC 1 Sorry sir, I didn't catch the word before 'control positions' – did you say all of the control positions? Is it that bad?

ASS I'm afraid so – it's going to be a busy evening, especially for those working the approach position. Lots of aircraft will want to land or divert before the snow starts.

ATC 2 Excuse me, I couldn't hear that last bit.

ASS We've got some heavy snow approaching and we'll have to get incoming aircraft down quickly or help them to divert. I hope it's going to get easier as the traffic volume decreases during the night. For tower, the night and morning shifts are going to be easier.

ATC 2 Sorry, sir – What did you say after 'morning shift'?

ASS It's going to be easier, because traffic is not going to move at the airport until tomorrow afternoon. The upper airspace is going to be very quiet over the next 12 hours as many flights are grounded.

ATC 1 I'm sorry sir. What was the first part of the sentence?

ASS To repeat – the upper airspace is going to be quiet during the next 12 hours because many flights will be grounded. For eastbound aircraft, it's not going to be easy flying into Bristol today, so we'll have to work hard to get this traffic co-ordinated. Now, any more questions? No? Then good luck everyone.

11

- 1 I didn't catch the word before 'control positions'.
- 2 I couldn't hear that last bit.
- 3 What did you say after 'morning shift'?
- 4 What was the first part of the sentence?

12

E = ES23, C = controller, PF = pilot flying, PNF = pilot non-flying

E Shenton tower. ES23. We're ready for departure but we can see lightning out to the right. Can we ... er ... wait here until the weather passes? ES23.

C ES23. Affirm. Hold short of runway. Stand by.

E Holding short of runway. ES23.



- C** Quickair 638. Tower and departing aircraft observe increasing rain and lightning south-west of the field. Amend your altitude ... maintain 2,000.
- PNF** Maintaining 2,000. Quickair 638
- PF** That's the edge of the storm to the left of the airport. Can we get a report on the weather?
- PNF** I'd appreciate a PIREP from the company traffic in front of us. Quickair 638.
- C** Quickair 638. Roger. Stand by. Quickair 638, Company 737 just exited the runway, sir. He said 'smooth ride'.
- PF** Say again. Quickair 638.
- C** Quickair 638, Company 737 said 'smooth ride'.
- PF** Roger, smooth landing conditions. Thank you. Quickair 638.

13

- C** Quickair 638. Cleared to land runway 27R. Surface wind 270° at 19 kt. Visibility 700 ft and decreasing.
- PNF** Roger, cleared runway 27R. Wind 270° at 19 kt. Visibility 700 ft and decreasing. Quickair 638.
- C** Quickair 638. Wind now 250° at 21 kt.
- PNF** 250° at 21 kt. Quickair 638.
- C** Quickair 638. That's wind 250 at 23 kt.
- PNF** 250° at 23 kt. Quickair 638.

14

- C** Attention all aircraft. Runway 27 arrival. Microburst alert. Be on the alert for wind shear. 35 kt loss one mile final. Quickair 638. Threshold wind now 250° at 24 kt. Watch out for any microburst activity. Be careful on short final.
- PF** Roger, wind speed now 24 kt. Looking out for microburst activity. Thank you. Quickair 638.
- PNF** That's -10 kt. Watch out! We're losing speed!
- PF** OK, we're -20 kt. This wind shear is going to prevent us from landing. Let's take it around to the right.
- PNF** Wind shear recovery profile. Maximum power. Nose up. Flaps and gear as they are.
- PF** Maximum power, nose up, positive climb.

15

short
visual
watch
roger

16

approach
edge
measure
switch
threshold
emergency
usual
shear

Unit 9

17

We were asked to pick up a VIP from a field by a large house, and take him to a Royal Navy ship for the day.

There were clear blue skies when we left, and we landed by the house, shut down and got out, ready to meet Prince Charles. After briefing him on the aircraft and safety, we strapped him in and started up. Once we were airborne, we called up the ship which was only about five miles away. We went over the top of the cliffs ready to let down, and suddenly all we could see was thick white fog. The best way to get onto a ship when the weather is not too good is to get the ships' radar to guide you in. So we went into the fog it was about 600 ft above sea level. Three-quarters of a mile from the ship, at around ... oh ... 275 ft, the ship suddenly radioed and said 'We've lost you on radar. Continue visually'. Well it's difficult to continue visually through fog so I decided that ... er ... we would go around, the ship. While we waited for them to clear us to come back round, I spoke to the prince, who has flown in the navy, and I explained what the options were. One option was to let down early to get down below the fog to about 100 ft, which is low enough to be a bit risky. I felt a bit worried because the situation was not routine, but anyhow that's the option we took. When we reached about 150 ft, I could just make out the outline of the ship about half a mile away. So I let down a little bit more, came out from under the fog, and I landed safely. The Prince got out, thanked me very much for some very good flying and went off for his day on board the ship.

18

aircraft
asked
safety
options
explained
thick white fog
the ship's radar
some very good flying

19

reverse thrust
available slots
thick smoke
climb vertically
dump fuel
damaged struts



20

P = pilot, C = controller

- P** PAN PAN, PAN PAN, PAN PAN. I'm having problems with my landing gear. Macair 319.
- C** Macair 319. Roger distress call. What is the problem with your gear?
- P** I can't see a green light for my nose gear. We felt and heard it extend, but there's no light. Request low pass for visual inspection. Macair 319.
- C** Macair 319. Cleared low pass runway 09. Surface wind 010 at 10 kt. Not below 500 ft. QFE 1006. Report final.
- P** Cleared low pass runway 09. Surface wind 190 at 10 kt. Not below 500 ft. QFE 1006. Macair 319.
- C** Macair 319. The nose gear appears down but ...

21

- P** I'm sorry. The nose wheel is in position? Is that correct? Macair 319.
- C** Macair 319. Negative, that's incorrect. The nose wheel appears down but it's at a 90° angle.
- P** I understand the nose gear is down but stuck at 90°. Macair 319.
- C** Macair 319. Affirm. That's right. On runway heading, climb to altitude 2,000 ft.
- P** FL 20, runway heading. Can we circle the aerodrome? Macair 319.
- C** Macair 319. Cleared to circle the aerodrome ...

22

P = pilot, C = controller

- P** A30. Airborne.
- C** A30. It appears your main gear hasn't retracted.
- P** Roger, my main gear has retracted. Thank you sir. A30.
- C** A30. Negative. You haven't understood. Your main gear is not retracted. It is still visible.
- P** OK. Our main gear is stuck ... er ... OK A30.
- C** A30. Say intentions.
- P** Er ... We're trying to figure out the problem. Stand by sir. A30.
- C** A30. Standing by.

23

C = controller, P1/2 = pilot 1/2

- C** S62. You are seven miles out on long final. How is your landing gear?
- P1** We've tried winding down the gear manually but it's stuck about halfway out. S62.
- C** S62. State intentions.
- P1** We don't have much fuel. We're going to land this time. S62.
- C** S62. Use runway 34R. There is smooth ground on each side of the runway and you have a lot of

space. Crash, fire and rescue services have been activated.

P1 Runway 34R. I have the field in sight sir. S62.

24

- P2** Tower, this is Fastair 350 on 3-mile final. The apron is to the right of runway 34R. Do you mean 34L for the belly-landing for traffic behind me?
- C** Fastair 350. Affirm. Thank you. Break. S62. Use 34L. I say again, runway 34L.
- P1** Runway 34L. We've wound the gear back up so we will have a smooth belly-landing. S62.
- C** S62. Roger. Smooth belly-landing.

Unit 10

25

RP = radio presenter, BP = Bob Pearson, JH = John Haskins, HC = Helen Clitheroe

- RP** If a Boeing 767 runs out of fuel, what do you have? A 132-ton glider. And that's exactly what happened to Air Canada Flight 143, which was en route from Ottawa to Edmonton, cruising at 41,000 ft, when the first warning light came on. Captain Bob Pearson recalls ...
- BP** We thought we had a failed fuel pump in the left wing, and switched it off. Our FMC showed more than enough fuel remaining for the duration of the flight. We had no indication of a fuel shortage.
- RP** But when a second fuel-pressure warning light came on, Pearson decided to divert to Winnipeg. They began descending, but the fuel flow stopped completely and they lost both engines due to fuel starvation. The \$40 million Boeing 767 became a glider, and the pilots were left with only a radio, basic instruments and limited control. The crew soon realized they couldn't make it to Winnipeg. They chose a disused Air Force base at Gimli, not knowing that it was being used for a family car-racing day. John Haskins was on the ground.
- JH** It just came out of nowhere, almost silently. You could just hear this 'whoosh' sound, and you looked around and there it was. It was coming in at this really strange angle, and we thought, 'it's going to crash'. But then it landed. It was incredible.
- RP** Helen Clitheroe was one of the event organizers.
- HC** I only saw it when I heard the bang of the tyres bursting and the nose smashing down on the runway, and all those sparks. When it stopped, we just picked up some extinguishers and tried to fight the fire, and help all the passengers off.
- RP** The only injuries were to passengers using emergency slides. The question of how a passenger jet with a fuel capacity of over 90,000 litres runs out of fuel remains for investigators.



26

RP Initial reports indicate problems with the fuel system. It seems that the cockpit fuel gauges were inoperative. In this situation, after the fuel hoses are removed, the fuel load is checked by hand, like when you check the oil in your car. The fuel measurement was then converted from volume to weight. The problem was that the calculation was done in pounds, but the new Boeing 767 is a metric machine. And so the system thought the data was in kilograms, not in pounds. The aircraft had just half the required fuel for the journey, and the crew had no idea.

27

PNF = pilot non-flying, C = control, PF = pilot flying, FA = flight attendant

C Polar 69. Roger. Report turning final, runway 29. Wind 320 at 10 kt.

PNF Report turning final, runway 29. Wind 320 at 10 kt. Polar 69.

PF Number one doesn't sound good. We're not running short of fuel, are we? We should have plenty of fuel.

PNF We've got fuel ... but fuel flow should be much higher. Torque pressure is meant to be at 100, not 40.

PF That's engine number one gone. Feather the engine.

PNF It's feathered.

PF Tell them we've got one engine shut down.

PNF PAN PAN, PAN PAN, PAN PAN. Bodo Tower, Polar 69. We've lost one engine ... er ... we're turning final at this time.

PF I smell smoke! We're losing the other one. Contact tower and tell them to get the fire trucks out.

PNF Tower, Polar 69 request fire, crash, rescue services.

C Polar 69. Roger. I'll activate fire, crash, rescue. Say your fuel and persons on board.

PNF Polar 69. Roger. We've got two crew and 120 passengers. I don't know about fuel. We've got a fuel problem.

PF Can we get the other engine going? We're not going to make it ... we'll have to land on the river.

PNF Tower, we've lost both engines. We're on final here to the river. Polar 69. You want the gear up?

PF Yeah put it up. We don't want it to catch on the ice. We've got smoke. Shut down number two.

PNF Pull both extinguishers?

PF Fire bottles.

Tower, this is Polar 69. We're down on the ice, nobody's hurt. We had a fuel flow problem and we lost power on the engines and couldn't get to the runway. We're on fire over here though ...

28

- 1 shot
- 2 cot
- 3 seat
- 4 hit
- 5 leave
- 6 stat
- 7 chat
- 8 mark

Unit 11

29

T1 = trainer, T2/T3/T4 = trainees

T1 OK everyone, let's begin the workshop by looking at the causes of decompression. Now, have any of you here ever had any decompression-related incidents?

T2 ... er ... well last year a flight of ours was delayed by four hours due to a cracked windshield. It was a tiny crack, very difficult to see, but the captain refused to fly until maintenance replaced the windshield.

T1 OK, it sounds like you guys did the right thing. Now, let's think about other possible causes of decompression. Any ideas?

T2 Bird strike.

T1 Yes.

T3 Failing to lock a door.

T1 OK.

T4 Metal fatigue.

T1 Good. Here I've got photographs of some real incidents. Can you pass the photographs around, please? First, here's a DC10 in June 1972, whose rear cargo door blew out due to a faulty lock. Rapid depressurization occurred when the door tore away a spoiler and smashed into the tailplane. OK, this one shows a famous incident of explosive decompression, this time with a Boeing 737 in April 1988. The aircraft had corrosion, and also serious metal fatigue. Almost 35 m² of metal tore away from the upper part of the fuselage, cutting off the electrics, all communication lines and oxygen supply. You can see here that the lower part of the airframe buckled and the nose dropped down by one metre. Unfortunately, one life was lost when a member of the cabin crew was sucked from the aircraft on decompression. Luckily, the nose gear locked down on landing.



30

In the picture you see here, a bird strike caused serious damage to a Boeing 767 in 2001 at flight level one-two-zero. A flock of birds dented the aircraft nose, fuselage and wing leading edges, and punctured the aircraft skin eleven times. One of the birds broke through into the cockpit and smashed the captain's instrument panel. Incidents like these can be fatal, but here the captain wasn't injured, and the crew managed to land safely.

Fortunately, explosive decompressions like these examples are very rare, but cabin crew and flight crew must be aware of the dangers. These incidents show that rapid decompression is very different to the controlled environment of a cabin simulator.

31

now
take
scenarios
real
series
photographs
here
rear
cargo
out
flight
zero
away
tailplane
depressurization
aircraft
safely
only
minor

32

P = pilot, C = controller, FA = flight attendant

- P** MAYDAY, MAYDAY, MAYDAY. Centre. Kite 63. Making an emergency descent.
- C** Calling station. Say again. Say again.
- P** This is Kite 63. I say again, Kite 63 making an emergency descent.
- C** Kite 63. Cleared to FL 100.
- P** Centre ... 63.
- C** Kite 63. You're breaking up. Say again.
- P** We had a rapid decompression. We are just west of the PAYAM VOR, passing FL 240. Kite 63.
- C** Kite 63. Understand you are depressurized. You are cleared to FL 100. I say again. Descend to FL 100. Report reaching.

- P** FL 100. Kite 63.
Centre this is Kite 63 level at 10,000. Request immediate landing.
- C** Kite 63. I can't hear you sir. Loud background noise.
- P** Centre this is Kite 63 level at 10,000. Request immediate landing.
- C** Kite 63. Read you 5. Squawk 7700.
- P** 7700.
- C** Kite 63. I understand you have lost cabin pressure. You are 40 miles from the field at your 11 o'clock, turn left heading 070° altimeter 1002. Say intentions.
- P** The captain is unconscious. Request immediate landing and medical services. Kite 63.
- C** Kite 63. Roger, straight in approach and landing runway 07. Wind 160 at 11 kt.
- P** Straight in approach and landing runway 07. Wind 160 at 11.
- C** Kite 63. Do you have any aircraft damage?
- P** Stand by.
- C** Kite 63. Standing by.
- P** You OK?
- FA** Yes. It's difficult to hear you.
- P** Have we got any damage back there?
- FA** I can't see unless I get out of my seat.
Er ... yes, the leading edges are badly dented, and the engine inlet cowls. I couldn't see any further back. Are we going to be OK?
- P** Yes, we'll be fine. Is anyone injured?
- FA** Yes, two were injured when they fell from their seats in the turbulence. What happened?
- P** Hailstorm.
- FA** How long is it going to take to land?
- P** It'll take about 15 minutes.
- FA** 50 minutes might be too long.
- P** Not 50 minutes – 15 minutes.
- FA** Ah, OK. One passenger is bleeding badly. We've got to get help soon, otherwise he might not make it.
- P** Sorry? Say again.
- FA** If we don't get to a doctor soon, he may not survive.
- P** We'll get him to a doctor as soon as we can. We'll have an ambulance waiting for us.
- FA** OK, thanks.
- P** Centre, Kite 63. We had a hailstorm that lasted about ... er ... ten seconds. The left side of the windshield has smashed, the right side is cracked, we have damage to our wings and maybe the tail, but the aircraft feels OK. We've got at least two serious injuries. Kite 63.

33

- 1 He's talking about outbound flights, not inbound.
- 2 Good? It was excellent!
- 3 You said the flight would leave at half-past seven, not half-past nine.
- 4 No, my first flight this week is Tuesday evening, not Tuesday afternoon.
- 5 Fly faster. Not slower.

34

- 1 I can't see unless I get out of my seat.
- 2 We've got to get help soon, otherwise he might not make it.
- 3 If we don't get to a doctor soon, he may not survive.

Unit 12

35

P = Presenter, KK = security expert

P On the subject of airport security, security expert Kalle Kaub is here to talk us through recent developments in airport security techniques. Kalle, Why a new technique?

KK The strategy for airport security has been almost completely technological. We have technologies such as baggage-screening equipment and explosive detection systems, but technology alone is not enough. We need to look for malicious intentions, and these have to be identified using other techniques.

P What are these techniques?

KK We are using 'behavioural profiling' or 'screening', which basically means that we look at passenger behaviour. When someone is about to commit a crime or a terrorist act, the stress affects their behaviour. And this stress behaviour is extremely difficult to hide or control.

P So what behaviour are you looking for?

KK We're looking for any physical signs that could show that someone is nervous or angry – signs that they might be planning a criminal act. These include avoiding eye contact and small movements of the lips, eyebrows and nose. Common body signs that indicate aggressive behaviour include the head moving forward, stepping forward on the left leg, and a hand position with the palms down. Rises in the volume and pitch of the voice may also show that someone is agitated. If people show just *one* sign of stress, they are probably not a threat. But if you observe multiple signs, then you can assume that they must have something to hide.

P And how do you use these techniques?

KK We have a team of officers monitoring the airport terminal area. If they detect behaviour that indicates a person may be a threat to security or the safety of a flight, they attempt to engage in casual conversation with that person. They try to make friendly eye-contact and ask simple questions to see if they react normally.

P Surely friendly conversations can't be enough to indicate if a passenger is a criminal?

KK Of course these questions can't determine if a passenger has criminal intentions, but they might indicate suspicious behaviour. The important thing is that if an officer feels unhappy they can send the passenger to secondary screening, including a body search, a physical inspection of carry-on baggage, or even police questioning.

P Do these techniques work?

KK Using behaviour detection we have arrested people on charges of drug possession and immigration violations and we've also seen a reduction in alcohol-related incidents in airport terminals and at the gates. The good thing is that training is simple, the technique requires no additional specialized equipment, and it presents yet one more layer in the security system.

36

detection
possession
suspicion

37

aviation
reaction
conversation
immigration
inspection
intentions
reduction
violations

38

PNF = pilot non-flying, PF = pilot flying, T = Tokyo Area Control Centre, I = Incheon Area Control Centre

PNF What's going on?

PF It sounds like someone trying to get in. Can you look on the video?

PNF OK ... I can see him. The flight attendants are struggling to restrain a passenger. Oh ... he's hit one of the attendants.

PF OK, notify Centre.

PNF Centre, We might have a problem here. Stand by. Interflight 547.



- T** Interflight 547. Standing by.
- PNF** It looks like they've forced him to the ground and got the cuffs on him.
- FA** We've a problem back here with a violent passenger. We've restrained him, but he's still struggling.
- PNF** Is he drunk?
- FA** I don't think so, but he's very agitated and abusive. He said we were in danger and he had to fly the plane. It must be a mental health problem.
- PNF** Is anyone hurt?
- FA** No, we're OK. What do you want us to do with him?
- PNF** Secure him, away from the other passengers if you can. Get someone to stay with him until we land.
- PF** Right, contact ATC and tell them that we've got an unruly passenger. Request a diversion to nearest suitable airfield. Have medical and security there to meet us.



39

- PNF** Centre. Interflight 547. A passenger has attempted to enter the flight deck. He's also attacked the cabin crew. There are injuries. We have restrained him but we need to get him off the plane as soon as possible.

- T** Interflight 547. Understand you have an unlawful interference. Please say fuel and persons on board.
- PNF** Er ... 178 persons and four hours of fuel remaining. Can we descend to the nearest available aerodrome? We'll need medical and security services ready. Interflight 547.
- T** Interflight 547. You are approaching Korean airspace. Contact Incheon Control on 123.6. I'll advise them of your situation and pass on your request.
- Hello, this is Tokyo Area Control Centre here. We have a problem B 757-200, Interflight 547, G585 westbound towards SAPRA at FL 340, squawking 1243. We expect it in your airspace at approximately 47.
- I** OK, a 757 squawking 1243. What's the problem?
- T** We had a report from the flight crew. They said a passenger had attempted to enter the flight deck. The first officer said that crew had restrained him, but believed he was still a threat.
- I** Roger, are there any injured persons?
- T** The crew told me there were injuries, but they didn't give details.
- I** Did they state intentions?
- T** They asked if they could descend to the nearest aerodrome, and they said they'd need medical and security services ready.
- I** Thank you. Leave it with us.

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