



1 Work in pairs. Discuss the following questions.

- 1 Do you think there are any airports or runways in Antarctica?
- 2 If there were regular air services to Antarctica, who would use them?
- 3 What kind of runway could be constructed in Antarctica?
- 4 What kind of aircraft could travel and land there?

2 Read and complete the following text with the words in the box.

aviator	construction	crosswinds	environment	equipment	fuel
maintenance	military	pull up	reduced	temperatures	winds

Commercial aircraft lands in Antarctica

An Airbus A319 landed this week in Antarctica on the newly-constructed Wilkins runway. This four-kilometre long runway is made entirely of ice, which is 500 m thick. On this first flight of just over four hours from Hobart in Tasmania, the pilots were able to see the runway from 10 km out and there were no problematical (1) _____ to deal with. After touching down, they were able to (2) _____ within 1,000 m, despite the lack of friction on the aircraft's wheels.

Construction on this runway started in 2005. Laser levelling technology was used to carve a flat, smooth runway out of the ice. Regular (3) _____ of the runway is also required as it has to be continually cleared of snow. The work took place during the summer months when (4) _____ in Antarctica can rise as high as -25°C . In addition to coping with temperatures such as this, workers had to deal with high (5) _____ of up to 100 kt. The runway has been designed to cause minimal damage to the (6) _____.

The closest wildlife is about 20 km away and no (7) _____ is stored at the runway. Aircraft using the runway need to be able to complete their return journey without refuelling.

The (8) _____ of this runway was an essential part of the Antarctic Airlink Project, to which the Australian government has contributed A\$46 million. The regular flights which are expected to begin soon will transport Australian scientists and their (9) _____ to nearby research stations much faster than before. Previously the scientists had to travel by sea. A typical journey time of ten days has now been (10) _____ to a short four-hour flight. There are no plans at the moment to make these flights available to tourists. While other countries have flown to Antarctica before, they have done so over shorter distances in (11) _____ aircraft. The runway has been named after Sir Hubert Wilkins, the explorer and (12) _____, who first flew to Antarctica in 1928.

3 Decide if the following statements are true or false. Write *T* or *F*.

- 1 Completion of this runway means aircraft can land in Antarctica for the first time. _____
- 2 The construction of the runway has caused important environmental damage. _____
- 3 The pilots on the first flight to this runway were able to land in good meteorological conditions. _____
- 4 Aircraft flying to this runway need to carry sufficient fuel for their return journey. _____

4 Do you think that one day this service will be available to tourists?

LANDING AN AIRCRAFT

Introduction

While landing an aircraft is probably the most complicated phase of flight, most landings are quite routine. Meteorological conditions may at times cause some added difficulties and pilots might also have to deal with situations in which their aircraft has developed some problems en route. However, even when such difficult conditions exist, pilots will have been trained in the special procedures required to deal with them and will still be able to land safely. The reading passage in Section 1 deals with airports that have unusual geographical features which present particular challenges when landing. Pilots need special qualifications before they are authorized to land at such airports.

Routine landings

Navigational landing aids are available at major airports and also at more minor well-equipped locations. The main navigational aid for pilots in landing an aircraft is the **Instrument Landing System (ILS)**, which is available on one or several runways at large airports. ILS enables pilots to make precision landings, even in conditions of low visibility. For each runway equipped with ILS, two beams are provided from stations installed on the ground to the cockpit. One beam provides the **localiser** which the pilot **intercepts** to line up and land in the precise direction. The second beam provides the **glide slope** which allows pilots to descend at the optimum rate. At an airport or on a runway where ILS is not available, a VOR / DME approach may be possible (see the introductory notes to Unit 2 for an explanation). In this case the pilot will use the VOR to line up in the precise direction required but will have to calculate the best rate of descent through the information provided by the DME (which informs the pilot of the distance remaining to be covered).

Where no such navigational aids exist (at small aerodromes, for example) or when navigational aids are out of service, a **visual approach** will be required. In a visual approach, as the name suggests, pilots use their own judgement to line up correctly and approach at a suitable rate of descent. This is in any case the normal procedure for VFR traffic and it is part of every pilot's initial basic training.

The basic mechanics of landing a modern jet aircraft are similar whichever of the three types of approach a pilot may be conducting. The pilot reduces airspeed sufficiently and extends the **landing gear** of the aircraft (also called **undercarriage**). The next stage is to **flare** (raise the nose slightly) just prior to landing. This important movement ensures that it is the wheels of the main landing gear which

touch the runway first and take most of the force of the landing. Then the pilot will gradually lower the **nose** gear and apply **reverse thrust** (a surge of power backwards from the engines which significantly slows the aircraft). Afterwards **braking action** can be safely applied. Applying the brakes directly without using reverse thrust is possible but not always desirable as it can significantly increase the risks of skidding. Light aircraft are only equipped to apply the brakes to slow down, but they are able to stop a lot easier and quicker than a large passenger airplane.

Major airports and even small aerodromes can be congested at times and aircraft may need to enter a **holding pattern** while they wait for authorization to land. The normal arrangement is that they circle at different altitudes (to ensure safe separation) until the controller gives them clearance to come in and land. This arrangement is known as a **stack** (in a diagrammatical representation the aircraft seem to be 'on top of' each other). The trend nowadays is to try and avoid stacks for commercial traffic if at all possible. Often aircraft will not take off until they can be provided with a **direct route** to their destination. Safety concerns have been expressed by some experts about regularly having large aircraft circling over major cities, though they have not been able to prove that there is a real danger. Increasingly it is the question of additional aircraft fuel consumption (which is expensive for the airlines) and emissions (which are of concern to environmentalists – see Unit 10) which influence the decision-making process.

Hazardous landings

The difficulties of landing in extreme weather conditions were discussed in the introductory notes for Unit 8. When an aircraft attempts a landing but subsequently has to climb and complete a circuit around the airport, this is termed a **go around**.

The pilot may go around for a number of different reasons which have nothing to do with meteorological conditions. Landing gear problems are quite common and the incidents in Section 3 are clear examples of what can go wrong. If a pilot discovers that the landing gear is not extending properly (or not extending at all), several options exist. One is to **make a low pass** which means flying low over the airport so that the controllers can look out from the control tower and inform the pilot as to how well the gear is extended. Pilots can also ask to enter a holding pattern to give themselves time to sort the problem out. In the worst possible scenario, when the gear is not working at all and the pilot is unable to sort the problem out, the only option remaining is to make what is



known as a **belly landing**. It certainly isn't comfortable for passengers and the aircraft may suffer damage and require expensive repairs.

It is possible for a pilot to request a **priority landing** for problems which are relatively minor. When a pilot has to declare an emergency for a more serious problem then there clearly is a risk to safety. An aircraft on an **emergency landing** will always have priority over all other aircraft. The appropriate emergency services will also be alerted.

Failure to declare an emergency proved fatal for a Boeing 707 flight in January 1990. The aircraft had left Medellin, Colombia bound for JFK airport in New York. Due to traffic congestion the aircraft had to enter a series of holding patterns which added around 90 minutes to the estimated flight time. When the flight was finally cleared to land, the first attempt failed due to poor visibility. While going around to come in for a second attempt at landing the engines ran out of fuel completely, resulting in a crash landing in a wooded area several kilometres short of the airport. About half of the passengers on board managed to survive.

The subsequent investigation showed that the flight crew had informed air traffic control that they were running short of fuel and had said 'we need priority', but at no time did they use the words 'fuel emergency'. For this the flight crew were criticized. But the controllers at JFK were also criticized for not having

realized the gravity of the situation. Communication problems were also identified as a crucial factor in this accident. The captain on board spoke no English and was communicating with the controllers through the younger less experienced first officer. After analysing the transcripts of what was said in the cockpit and on the frequency, investigators were left with the impression that the captain wanted to declare an emergency but that the first officer was rather reluctant to do so.

Several months later another flight to the same airport reported having only fifteen minutes of fuel remaining. The pilot when asked if he wanted to declare an emergency declined to do so. The controllers themselves decided to take the initiative and declare an emergency for the flight (an unusual but authorized procedure) and the aircraft landed safely.

VIP Flights

An interesting part of a controller's job is that they may have VIP flights passing through their sector. ATC provides a service that is as safe as possible for commercial air traffic so they couldn't improve this in any way for VIP flights. Depending on the country they work in and the importance of the person or people concerned, ATC might be asked to give priority to a VIP aircraft (for example, arrange a priority take-off or landing, or a preferred faster routing).

for fun



An approach not to be recommended ...

Tower: Aircraft on final, go around, there's an aircraft on the runway!

Pilot trainee: Roger ... (pilot continues descent)

Tower: Aircraft, I said GO AROUND!!!

Pilot trainee: Roger!

The trainee lands the aircraft, rolls towards the aircraft on the runway, goes around it and continues to the taxiway.

LANDINGS

Section one – Touchdown

This section deals with four examples of landings at airports which offer pilots and passengers a unique experience. Through discussion of the particular features which make these landings exceptional, much vocabulary related to landing an aircraft is presented. The section also teaches the language function of describing sensory impressions.

- 1 Before opening books and beginning the unit, introduce the theme of this section by asking your students:

Have you ever flown into an airport where landing is a particular challenge, either as a pilot or as a passenger?

Can you give examples of such airports?

Have you ever landed at any such airports using a computer program such as Microsoft flight simulator? (You can leave this question out if you don't think it's likely to generate a positive response.)

When answering, students may mention one or more of the four airports featured.

- A Courchevel Altiport, France
- B Princess Juliana International, St Maarten
- C Kai Tak International, Hong Kong
- D Tegucigalpa – Toncontin International, Honduras

- 2 The aim is to elicit some of the vocabulary that appears in the comments on the internet forum in Activity 3. Provide students with the structure *At airport x a pilot could have problems with ...* so that the focus of this activity remains on the vocabulary.

You may also wish to ask students to cover the text so that they are not tempted to look there for the answers.

- 3 The following terms should be conceptually familiar to the students in their own language, though they may not know them in English:

short final: the last part of the approach to an airport, just before landing.

touchdown zone: this is the section of the runway within which the aircraft is required to touch down.

roll-out: after touchdown an aircraft requires a certain length of the runway to slow down before exiting the runway.

backtrack: certain small airports are configured in such a way that you need to go all the way to the end of the runway, turn around and taxi back in the opposite direction before you can exit the runway (after landing). Departing aircraft might need to complete a similar manoeuvre before take-off.

marker: used to guide a pilot to approach a runway on the optimal flight path.

bank hard: the pilot needs to roll the aircraft (using the ailerons) at a steep angle.

displaced threshold: the threshold of the runway is normally the beginning of the runway, but sometimes the surface here is unsuitable for touching down on, and so the runway is said to have a displaced threshold, some distance further on from the actual beginning.

When the students finish the matching activity they can compare the pilots' reports with what they said in Activity 2. Students might try to produce some expressions to be taught in the Functional English section (e.g. *it looks / it seems*). It's best to let them do so, but don't correct or comment on what they say yet.





4	Which airport	CVF	SXM	HKG	TGU
	has no procedure for a missed approach?				
	has a problem with bright light?	✓			
	has problems with braking?		✓		
	Which airports				
	have sloping runways?	✓			✓
	have high bank angles on approach?			✓	✓
	have roads near the runway threshold?		✓		✓
	have mountain obstacles on the approach paths?			✓	✓

- 5
- 1 the angle of bank needed at HKG
 - 2 the distance of the cliff from the end of the runway at TGU
 - 3 the distance you have for roll-out at SXM
 - 4 the gradient of part of the runway at CVF
 - 5 the turn you have to do on the runway on departure from SXM
 - 6 the distance you have to line up before touchdown at TGU
- 6 The aerodromes students know well, or work at, are likely to have fairly routine approach patterns. Nevertheless, it is worth asking this question as every approach is different.

Vocabulary – Landing gear and braking

Note that you *extend* the landing gear before landing (it needs to lock into position) and you *retract* it after take-off. Another pair of opposites are *flare*, the pilot lowers the tail just prior to landing and *rotate*, the pilot raises the nose while the main gear wheels are still on the ground, just prior to take-off.

Most of the vocabulary presented here appeared in the internet forum. If the students have problems with some of the vocabulary, you can suggest that they refer to the internet forum and read the word in context.

roll out A
lock G / B
rotate D
seize G / B
overheat G / B
retract D
extend A
collapse G / B
flare A
get stuck G / B
touch down A
line up D

Functional English – Describing sensory impressions

- 1 After students have completed the activity, present the following points.
- *look(s)* + adjective
 - *look(s) like* + noun OR *look(s) like* + subject + verb
 - *look(s) as (if / though)* + subject + verb
- Note: these structures have a similar meaning and refer to the visual sense
- *seem(s)* + adjective OR *seem(s)* + subject + verb
 - *seem(s) as (if / though)* + subject + verb
- Note: these structures have a similar meaning and may refer to one or more senses (not explicitly stated).
- 1 looks, looks like
 - 2 seemed
 - 3 felt as if
 - 4 looks as though

- 2 / 3 These activities allow students to practise the Functional Language in an interesting and structured way. Note that they can use both *look* and *seem*. They will be using their visual sense to do the activity and *seem* is perfectly appropriate for this sense, as well as for other senses.

Speaking

This is a free practice and what students say will depend on what experiences they have to share. If they have not personally experienced such problems, you could encourage them to relate incidents they might have heard of.



Section two – Letting down a VIP

This section deals with the transportation of a VIP by helicopter, which lands on a ship in difficult meteorological conditions. It teaches the language function of describing three-dimensional position and movement. It also teaches verbs of movement and practises the pronunciation of words containing potentially difficult consonant clusters.

- 1 There are a range of different answers that students might give to this question. It's possible that they have some personal experience of VIP flights to share with the group. If not, you can simply let them talk about what they think the arrangements might be.
- 2 17 Before students listen, tell them that it was a very well-known British VIP who was being transported. Encourage them to speculate on who (the second question) before listening.
 - 1 from a house to a ship
 - 2 Prince Charles
 - 3 fog

17 Listening script

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 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.

- 3 17 If your students found the listening easy, you could have them answer the questions they think they can remember before listening a second time to confirm their answers.

After students have checked their answers, ask them to imagine how Prince Charles would have felt about the flight. They might like to consider the point that he had flying experience in the navy and consider what effect this would have had upon him.

 - 1 by
 - 2 five
 - 3 after
 - 4 $\frac{3}{4}$
 - 5 couldn't see
 - 6 was an experienced flyer
 - 7 risky
 - 8 150 ft



Functional English – Describing 3-D position and movement

- Before starting the activity, ask students to work in pairs and to use their hands to demonstrate these prepositions. Explain that many of them are used with the word *fog*. To feedback to the group, draw a ship and some fog on the board. You can then call one or more students to the board and have them demonstrate the prepositions to the group. Be ready to help out and correct as necessary.

- over
- onto
- into
- through
- around
- below
- out, under

- 17 Ask them to complete the activity and when they finish, play the listening again so that they can check their answers.
- This activity allows students to practise use of the prepositions in a controlled way. Make sure that they mark the route their partner describes and that they check, confirm and clarify any details of the route they are not sure of. They should take their time and be reasonably confident of the routes they have both drawn before they show each other their pictures.
- If your students are pilots, then they will have no trouble in describing an interesting flight they made (even if it wasn't necessarily their most recent one).

Those who don't fly can, as explained in the instruction, describe the last flight they took (as a passenger). It's possible they might not have very much to say about this, if so, try one of the following:

Ask them to close their books and describe the flight Prince Charles took in as much detail as they can remember. Ask them to add in one extra detail which is not true. Their partner has to identify this 'mistake'.

Ask them to imagine a flight description, as concise as possible but still plausible, which includes all eight prepositions. You can set this up as a challenge to see who can produce the shortest description which uses all eight prepositions.

Vocabulary – Verbs of movement

- 17 Unless you have a very strong group, your students might find this activity quite difficult. There are a lot of phrasal verbs which could be confusing for students. You may choose to present some of the phrasal verbs they are less likely to know before they begin the activity. For example:

come back round – to make another approach and an attempt to land

get down – to descend

get out – to disembark

go off – to leave

let down – to descend

pick up – to meet someone and transport someone

Students can check their answers by listening again, but this may not be necessary if they have mostly correct answers. You could let students decide whether or not they need to listen again.

- pick up, take
- left
- landed, got out
- come back round
- let down, get down
- reached
- got out, went off

Pronunciation – Consonant clusters 2

1 / 2 / 3 18,19 These activities provide useful practice in the pronunciation of consonant clusters, some of which occur when words are run together.

You can play the following game to round off the activity in a fun way. Students have to pronounce all the clusters from Activities 1 and 2 in succession in an 'acceptable' manner (the group will decide what is acceptable). If they pronounce one 'wrongly', they have to go back to the start. The winner is the student who pronounces all fourteen correctly in the shortest time. Choose a confident student to begin the game. If you have a large class, divide the students into two or more groups. If the activity goes well, you may wish to organize a class competition between the winners from each group.

1

18 Listening script

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

3

19 Listening script

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

Speaking

This activity provides free speaking practice and gives students an opportunity to talk about some of the issues relating to flying VIPs. There are likely to be different views on some of these questions in the class, possibly leading to lively discussions.



Section three – Undercarriage

This section deals with landing gear problems and contains a listening comprehension activity in which students listen to three separate pilot-controller dialogues on the subject. The section presents the language function of resolving misunderstanding.

- 1 The important point in this activity is to give each student sufficient time to study the picture chosen (one minute), to understand the problem and then to practise explaining the problem without looking back at the picture (their books should be closed). Encourage the students who are listening to ask questions if anything in the description is unclear. Students may try to use some of the language you will be teaching in Functional English. Try to monitor any language they use to resolve misunderstanding, but don't correct them yet.

Another way to approach the activity, if you are teaching a strong group, is to do the activity in pairs and allocate two pictures to each student.

As well as offering practice in explaining technical problems, Activity 1 also prepares the students for the main listening comprehension task to follow in Activity 2.

- 2 20,21,22,23,24

1 B 2 C 3 A

20 Listening script

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 ...

22 Listening script

- 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.

21 Listening script

- 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 ...

23 Listening script

- 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 Listening script

- 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.

- 3** **20,21,22,23,24** If they feel confident enough, students could try to choose the correct answers from what they remember before listening a second time to check.

20,21

- 1 doesn't have
- 2 orbit the aerodrome

22

- 3 departing traffic
- 4 try and solve the problem

23,24

- 5 little
- 6 behind

Functional English – Resolving misunderstanding

- 1** **22,23** Students may feel confident to complete some of the answers before they listen for a third time.

- 1 Is that correct?
- 2 That's incorrect.
- 3 I understand
- 4 Affirm. That's right.
- 5 You haven't understood.
- 6 Do you mean

- 2** Ask students to close their books and write the following questions on the board:

In communications on the radio ...

how do you ask someone to repeat something?

how do you check if someone has understood correctly?

how do you confirm to someone that they have understood correctly?

how do you tell someone they have not understood correctly?

how do you tell someone what you have understood?

how do you repeat something?

For each question, ask a student to come to the board and note one or more ideas put forward by the class. Students can then open their books and complete the activity. Afterwards, they will be able to check their collaborative efforts against the suggestions in the book. You can help them as necessary.

In some cases, they will have suggested other expressions which are also correct. You will be able to give them feedback on these.

1 c 2 e 3 f 4 d 5 b 6 a 7 f 8 f 9 b 10 b

- 3** This activity provides controlled practice of the functional language.

If your class doesn't divide neatly into groups of three, you could form groups of four. In this case, ask two different students each time to share one of the roles. They can read half of the report each and the task remains the same.

Speaking

This activity offers students the opportunity to freely discuss the important topic of misunderstanding and how it can be resolved.



Section four – Language development

Functional English – Describing sensory impressions

- 1 1 c
- 2 f
- 3 g
- 4 i
- 5 h
- 6 b
- 7 j
- 8 a
- 9 d
- 10 e

Describing 3-D position and movement

- 2 1 sounds
- 2 as
- 3 looks
- 4 seems
- 5 appears
- 6 like
- 7 though
- 8 impression

- 3 1 above
- 2 around
- 3 below
- 4 down
- 5 into
- 6 under
- 7 out of
- 8 over
- 9 through
- 10 towards

Resolving misunderstandings

- 4 1 Do you mean a belly landing?
- 2 I say again. Request emergency landing.
- 3 Is it correct that you have little fuel remaining?
- 4 Please read back in full.
- 5 Reception is poor. Say again.
- 6 No, that is incorrect.
- 7 The reading on the screen is wrong.
- 8 Please understand that we cannot allow you to land.
- 9 I'm sorry, but you haven't understood.

Vocabulary – Landing gear and braking

- 1 1 d
- 2 f
- 3 j
- 4 b
- 5 c
- 6 h
- 7 a
- 8 e
- 9 g
- 10 i

- 2 1 at, to, in front of
- 2 On
- 3 in
- 4 at
- 5 to
- 6 on
- 7 in, between
- 8 from



PHOTOCOPIABLE ACTIVITY

This activity contains a text on a technical issue. The students may not be aware of the issue, or they may not know much about it. For the pre-reading Questions 1 and 3, *don't know* is the most likely answer. However, students will probably be able to correctly answer *no* to Question 2.

Have students match the words to form collocations. Then in pairs have them explain the meaning of each collocation as used in the text.

There is one discussion question and students may have quite a lot to say in response. They might mention the future development of aircraft, an increasing reliance on technology and a continuing drive for greater efficiency in the industry.

Key

- 1 e 2 d 3 f 4 c 5 g 6 b 7 h 8 a



- 1 Work in pairs. Discuss the following questions. Then read the text to check your answers.
 - 1 What do the abbreviations ETOPS and LROPS stand for? Can you guess?
 - 2 Can a passenger jet with two engines fly on any route in the world?
 - 3 What is the maximum time permitted for a twin-engine to reach a diversionary airport in an emergency?

From ETOPS to LROPS?

A safety regulation governing the operation of twin-engine aircraft was first adopted in 1953 by the FAA (Federal Aviation Agency). This regulation stated that these aircraft should be no more than a maximum of 60 minutes flying time away from an alternate (a diversionary airport). The ruling effectively excluded twin-engine aircraft from certain routes. It was considered dangerous to fly for long distances over sea, a desert or an otherwise inhospitable area in an aircraft with just two engines, in case one of them should fail. As jet engine reliability improved, this maximum diversion time permitted for a twin-engine gradually increased. Outside of the US, the ICAO (International Civil Aviation Authority) regulation, which granted a maximum diversion time of 90 minutes, became the norm.

The term ETOPS (Extended Range Twin-engine Operations) dates from 1985, when the FAA, followed a short time later by the ICAO, extended the diversion time to 120 minutes. The justification for doing so was the continuing development in technology and improvements in engine reliability. This was a significant step because it allowed

twin-engines to cross the Atlantic. Just a few years later the time was extended to 180 minutes. This regulation means that twin-engines, which meet the strict certification criteria, can fly across 95% of the world's surface. Such aircraft are known as ETOPS-180 certified.

The new term which is being discussed now is LROPS (Long Range Operations) which would be a certification granted regardless of the number of engines on an aircraft. One of the main reasons for introducing a new certification standard, that would envisage much greater maximum diversionary times (as high as eight hours), would be to allow aircraft to fly more direct routes, sometimes taking them over the north and south poles. Even when a possible diversionary airport exists near the polar regions, the extreme temperatures on the ground make a diversion dangerous. Some experts believe that LROPS could be a suitable standard for the new Airbus A380. Failure of one of its four engines would not cause any serious problem. Most diversions nowadays, however, are for reasons other than engine failure. In any medical emergency the passenger concerned might have to wait a long time to get to hospital. The medical equipment on board, the training of the flight crew to deal with medical emergencies and the availability of a medical advisory service would all be necessary conditions for LROPS certification.

- 2 Match the following words to make collocations used in the text. Then check your answers.

1 advisory	a regulation
2 certification	b area
3 diversion	c reliability
4 engine	d standard
5 extreme	e service
6 inhospitable	f time
7 medical	g temperatures
8 safety	h emergency
- 3 Work in pairs. Without looking at the text, explain the meaning of each collocation in Activity 2.
- 4 Would you board an aircraft knowing that during the flight you might be eight hours away from a safe landing?

FUEL CONSUMPTION AND ENVIRONMENTAL ISSUES

Introduction

The environmental debate which surrounds civil aviation is not new. Noise around airports has been a major concern of local residents for years and in the 1970s the entry of Concorde into service created great controversy. In the end, Concorde was authorized to land on the east coast of the US, but not to fly over the rest of the country, effectively preventing it from serving more than a minority of airports. Some analysts claim that it was this restriction which seriously affected the long-term commercial viability of supersonic travel.

Environmental concerns over the impact of civil aviation in general have grown significantly in recent years. There is no sign that they will diminish and nearly everyone agrees that the debate will grow in importance in years to come with the increase in air traffic. Passenger numbers fell after September 11, 2001 and during the SARS crisis in 2004, but the current and forecast worldwide growth rate is at least around 5% per year. Specific issues include aviation's contribution to global warming, noise and air quality around airports, as well as the destruction of the environment caused by airport development itself.

Aviation and global warming

The article in Section 1 summarizes the main issues and arguments on both sides (the aviation industry and environmental groups). Over the last couple of years it has been the subject of particular attention by the media in most developed countries. Civil aviation authorities are usually backed by their governments when they claim that effects are minimal. This is because civil aviation provides a major contribution to a country's economy. As well as directly generating revenue, the sector provides many jobs. Aircrafts bring people doing business into the country (thus helping expand other sectors of the economy) as well as visitors and tourists who will spend money. Any attempt to limit or even reduce flights could have serious economic consequences. However, the environmental lobby argues that the economic consequences would be a price worth paying for the preservation of our planet. Both sides have different sets of figures and cite different sources to support their positions. It is a serious issue which will continue to be debated.

One of the most serious questions surrounding the issue is to what extent aircraft emissions at 30,000 ft might cause more serious damage than ground-level emissions (by cars, for example). Scientific evidence on this point is inconclusive at present.

The spotlight has also been on **low-cost** airlines in recent years as they have been at the forefront of a general reduction in fares for short haul European travel, leading to an increase in air travel. In many countries, it is now more expensive to take a train than to fly.

One recent argument by the environmental lobby is that aviation fuel should be taxed. As part of a global agreement to encourage the growth of aviation (in the days when it needed encouraging) aviation fuel has been exempt from tax for many years. Demands for this exemption to be lifted are growing. But the airlines claim that higher fares and less passengers would bankrupt them.

Other environmental impacts of aviation

Concerns over aircraft noise led to **noise abatement** procedures to minimize noise for people living near airports. The procedures are not new but they are becoming stricter as traffic increases and complaints grow. Depending on the airport concerned, authorities might restrict the hours when aircraft can land or take off, impose a steep rate of climb or descent on aircraft or ban older, noisier airplanes from using the airport altogether. Aircraft constructors are under increasing pressure to produce quieter aircraft and to a certain extent they are succeeding. When the Airbus A380 flew for the first time in 2005, many people were amazed by how quiet it was.

Air quality around busy airports is another concern. In recent years, partly because of the low-cost boom, traffic flying over London has increased greatly. Some child welfare groups claim that there is a direct link with the increasing rate of asthma among children in the London area. The aviation authorities contest this.

In many western countries it is now almost impossible to develop an existing airport or to locate a site for building a new one due to the powerful objections of local residents' groups. Heathrow airport authorities have won provisional approval to build a third runway, but it is an extremely controversial development and those objecting believe they will be able to prevent it from ever happening. A few years ago the French authorities announced that they intended to construct a third airport for Paris. Once they began to name potential sites for the construction they encountered angry protests from the local people in the areas identified. They eventually withdrew the project and upset the people living near the other two Parisian airports who were hoping for a reduction in noise with some aircraft flying elsewhere.



Fuel requirements

One critical question to be taken into account when planning a flight is how much fuel to take on board. In the case of commercial airlines, it is usually the job of a **flight dispatcher** to make the appropriate calculations and ensure that the fuel is correctly loaded. Running out of fuel (**fuel starvation**) in an aircraft is potentially fatal (the incident in Section 3 provides an example where pilots were able to save the situation). The first question a pilot (or flight dispatcher) needs to ask is what should be the normal **fuel consumption** assuming all goes according to plan en route. Fuel consumption will depend on the type of aircraft being flown, the **payload** (weight of passengers, bags and cargo) as well as the weight of the fuel itself. After that, the pilot or flight dispatcher must add a certain reserve to cope with unexpected circumstances. These can result from changing weather conditions (e.g. increased headwind), the need to divert to another airport, the need to enter a holding pattern for some considerable time before descending to the planned destination and also the need to carry out a missed approach and go around. Excess fuel on board means more weight and less efficiency, but it is obviously better to think of safety and carry more fuel than is really necessary. A further consideration is that an aircraft should not have too much fuel remaining when it lands as the extra weight will cause what is termed an overweight landing.

An overweight landing can be a safety hazard and can also seriously damage an aircraft. In the case where an aircraft has to return to the airport just after take-off (for example an engine problem) the pilot may want to **dump fuel**. Air traffic controllers will then direct the pilot to a pre-designated area to carry out this operation.

In the introductory notes to Unit 5, the incident involving an A330 which ran out of fuel halfway across the Atlantic was mentioned. The pilots managed to glide the aircraft almost 100 miles to a safe landing in the Azores. Initially the story was of a heroic rescue by the pilots, which was undoubtedly

a fair assessment as the consequences would usually be fatal for a large passenger aircraft in a situation such as this. But inevitably attention turned to how the aircraft had run out of fuel. It emerged that a serious **fuel leak** had developed in one of the aircraft's two engines. This was subsequently blamed on inadequate maintenance work prior to departure. The pilots were not aware of this, they were only aware that there was a **fuel imbalance**. They decided to open the **cross-feed valve** to divert fuel from the wing tank which was functioning properly to the engine with the leak, thus inadvertently emptying all their remaining fuel into the ocean. Following this serious incident, updated instructions were issued by the aircraft manufacturers which warn flight crews not to feed fuel from one side to the other unless absolutely sure that no fuel leak exists.

If there is any doubt as to whether an aircraft will have enough fuel to enter a holding pattern, a controller will always ask the pilot to state the aircraft's **fuel endurance** or 'endurance' (how long the aircraft can continue to fly). There is now even more importance attached to this check in light of the Boeing 707 accident which was discussed in the introductory notes to Unit 9.

Depletion of oil reserves

Aviation fuel is a derivative of oil. Everyone agrees that oil will run out one day. Nobody seems to agree on exactly when but increasingly scenarios are suggesting it could be sooner than most people think. For the moment the price of oil remains high and this has already had a negative effect on the profitability of many airlines (hence the controversial fuel surcharge that some airlines place on tickets). Few analysts expect the price of oil to fall in the foreseeable future. The search for alternative fuel sources to power aircraft has begun but it's still in its very early stages. The automotive industry, for example, has conducted a lot more research and is better placed to deal with the future problems which will undoubtedly arise in both sectors.

for fun



A false alarm ...

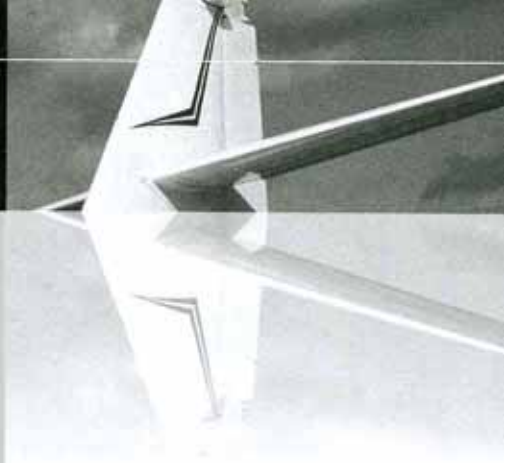
Cessna: Tower Cessna 342, student pilot, I am out of fuel.

Tower: Roger Cessna 342, reduce airspeed to best glide. Do you have the airfield in sight?

Cessna: Er ... Tower ... I am actually on the ramp, I just want to know where the fuel truck is located.



FUEL



Section one - Aviation and global warming

This section deals with the issue of aviation's contribution to global warming. A reading text presents the arguments both for and against the idea that aviation is a significant contributor to global warming. The section teaches the prefixes to form negative words and the language function of suggesting solutions to problems.

- 1 If you think that your students will already be familiar with this vocabulary, you could ask them to keep their books closed and write words 1–6 on the board. Students suggest nouns that the words collocate with when talking about environmental issues. They can then open their books and compare their suggestions with the collocations given.

1 f 2 e 3 a 4 c 5 d 6 b

- 2 Students' opinions may vary. Some students may feel the need to defend the industry that they work in. On the other hand, global warming is a phenomenon that concerns everyone, regardless of the sector they earn their living in.

- 3 This initial task checks that students understand the main views expressed in the text. The role of IATA, based in Montreal, is to promote civil aviation worldwide.

It is worth drawing students' attention to the useful phrase *restore a balanced view*. Many people working in the aviation industry believe that aviation has been unfairly criticized, and that aviation's negative environmental impact has been grossly exaggerated.

1 yes 2 no 3 yes

- 4 This task requires students to read the text again in order to identify which organization each statement relates to.

Note the mention of *cirrus clouds* in Statement 5. Jet engines at altitude produce vapour trails, known as *contrails*, which are often visible on a clear day. Sometimes these vapour trails go on to produce cirrus clouds. At present, there is no clear evidence as to the extent to which such artificially-created cirrus clouds harm the environment.

- 2 IATA
3 T & E
4 IATA
5 T & E
6 EC
7 IATA
8 T & E



Vocabulary – Prefixes

- 1 If you think your class will find this activity difficult, you could tell them that there are four words for *dis-* and *in-* and five words for *un-*. You could also tell them that in this particular activity, the negatives which are formed with *dis-* are all verbs.

There are no firm rules that can be provided to explain which word will take which prefix. Intuitively, however, students will probably be able to find most of the answers and you can correct the ones that they are unsure of.

dis-	in-	un-
disable	incorrect	uncontrolled
disagree	insufficient	unusual
disprove	invalid	unavailable
disconnect	inadequate	unauthorized
		unable

Functional English – Suggesting solutions to problems

- 1 Encourage students to brainstorm solutions in note form at this stage. If you think that students will be tempted to look for answers in the text, ask them to close their books.
- 2 Students can add any additional suggestions they find in the text to their own ideas.
- 3 After students have underlined the correct answers, present the following patterns:
One / Another + solution / option / alternative + would / could be to + verb
subject + could + verb

Point out that the first pattern is more likely to appear in written English or in formal contexts, whereas the second pattern is easier to use and might be preferred when speaking informally. Students can now go back to the points they listed in Activity 1 and practise making full sentences using both these patterns.

we need to consider, One solution to this could be to, Another option would be to, Alternatively, governments could, An alternative to this would be to

Speaking

- 1 This activity offers free practice of the functional language presented above. Students talk about several environmental issues concerning civil aviation.

Note that students may require some clarification on the third issue, *water pollution from de-icing*. To de-ice an aircraft, it is sprayed with a liquid which is 45% water and 55% glycol (a toxic liquid). Most airports do not recapture this liquid after use and there is some concern that it may eventually end up in waterways, risking a contamination of the water supply.

- 2 Some answers students might suggest include:

ATC: allowing more direct routes

pilot: taxiing on one engine instead of all engines

aircraft operators: buying more fuel-efficient aircraft

aircraft designers: designing more fuel-efficient aircraft



Section two – Gimli glider

This section deals with an incident in which an aircraft had to glide to an emergency landing after running out of fuel completely. The section teaches the vocabulary used to talk about fuel and fuel problems. It also presents the pronunciation skill of knowing where to pause in order to be more clearly understood.

- 1 Ask students to keep their books closed and write the word *fuel* on the board. Ask them to work with a partner and find as many two-word collocations as possible. They should be familiar with most of these collocations in their own language, but may not know the English terms. Encourage students to explain what they want to say by paraphrasing and you can then supply the appropriate vocabulary. Call students to the board to list their collocations, before asking them to open their books and do the activity.

1 g 2 e 3 b 4 i 5 a 6 d 7 c 8 f 9 h

- 2 For Question 1, your students will probably tell you that this is an extremely serious situation. While it is a rare occurrence, mistakes are sometimes made. Some students may know the story of the Gimli glider, others may know something about the flight which glided to safety in the Azores (see introductory notes to this unit).

When an aircraft does run out of fuel, the only option for pilots is to declare an emergency and attempt to glide to a safe landing. They are trained on simulators to land safely in such circumstances, but most pilots would hope never to have to put this training into effect.

- 3 25,26 Ask the students to talk about the picture and speculate on the most likely headline before listening to the radio report.

'Silent flight crash-lands at sports event' is the best headline.

25 Listening script

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 Listening script

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.



- 4 25,26 Students listen again to identify the reason why this aircraft ran out of fuel. The incident was widely publicized afterwards, which should prevent a recurrence of such an elementary error.
- 1 Because they lost both engines due to fuel starvation.
 - 2 The cockpit fuel gauges weren't working, and too little fuel had been put in because the amount was mistakenly calculated in pounds rather than kilos.
- 5 25,26 This is the third time students will listen to the incident. If they seem to have already understood quite a lot about what happened, you could ask them to do Activity 5 based on what they can remember. They can then listen to check their answers.
- 1 F 2 F 3 T 4 T 5 T 6 F 7 T 8 F 9 F

Pronunciation – Information groups

- 1 / 2 Answers may vary a little, you should be prepared to accept any alternatives which sound reasonable.

It is possible that your students may not at first understand the usefulness of this activity. You can ask them to keep their books closed and just listen, while you read the report with no pauses, or perhaps read it while pausing in various inappropriate places. They will then see that it is almost impossible to understand the report unless pauses are placed appropriately.

(Suggested answer)

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

- 3 26 After they have listened, allow students the opportunity to practise this model answer, while emphasizing that it is not the only way to read the text.

Speaking

- 1 / 2 Students' answers will almost certainly vary. You should allow students to freely discuss their ideas in small groups, before coming together and trying to reach a class consensus.

(Suggested answers)

A forest, the sea or a river are probably the worst options.

Unless an aircraft is specially equipped, a successful landing on water is very difficult.

Landing in trees could be fatal.

Landing on a frozen lake might initially seem to be equally treacherous if, as seems likely, the ice breaks. But in fact the incident in Section 3 indicates that this is possible, providing that the water is sufficiently frozen over. If landing on ice, a beach or on marshland, a pilot would choose to keep the landing gear retracted and make a belly landing.

There have been numerous cases of light aircraft successfully landing on roads, particularly in rural areas, and large aircraft landing on motorways. But to attempt such a landing would clearly put the lives of those on the road at risk.



Section three - Fuel icing

This section deals with an incident in which fuel icing leads to the loss of both engines on an aircraft which is on final approach. The difference between long and short vowel sounds is presented and practised, and the language function of expressing expectations is also taught.

- 1 The danger of ice building up on an aircraft's wings, as well as the problems that ice or snow on a runway might cause were discussed in the introductory teaching notes to Unit 8. For aircraft flying in extremely low temperatures, a further danger is that of fuel icing. If fuel can no longer be pumped into the engines, then the situation is as bad as if the aircraft had run out of fuel.
- 2 27 Note that the extremely low temperatures which caused the problem in the first place allow the aircraft to land safely on a frozen river.
 - 1 It is very cold. The river is frozen.
 - 2 One of the engines stops, followed by a second engine.
 - 3 They land on the ice. Nobody's hurt.

27 Listening script

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

- 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.
- 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 ...

- 3 27 If students seem to have understood well on the first listening, you could have them do this activity based on what they remember. They can then listen a second time to check.

1 lower 2 100 3 fire, crash, rescue services 4 122 5 on a river 6 No



Functional English – Expressing expectation


The three structures given are similar in meaning. You could also review the formation of the negative structures:

should – shouldn't

meant to / supposed to – not meant to / not supposed to

- 1 (Suggested answers)
 - 2 it should be higher
 - 3 it shouldn't be (on)
 - 4 it isn't supposed to be (down)
 - 5 it is meant to be off
 - 6 it is meant to be at 100
 - 7 they should have (enough)
 - 8 they're supposed to be (on final)
 - 9 they're not meant to be (flashing)
- 2 This activity provides further practice of the language taught in this language function.

Pronunciation – Long and short vowel sounds

- 1 / 2  28 Activity 1 checks if students can hear the difference between the long and short vowels. Before students do Activity 2, you could demonstrate the differences between the long and short vowels, perhaps exaggerating these in order to make sure students can hear them. Show how your mouth moves differently to produce the longer sounds, pointing out the following:

- For *short* you purse your lips.
- For *seat* you move your lips sideways as if trying to show all your teeth and smile.
- For *start* you open wide your top and bottom lip.

Students could practise the mechanics of making these different sounds, so that they can understand the difference.

1 A 2 A 3 B 4 A 5 B 6 A 7 A 8 B

28 Listening script

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

- 3 Students might find this activity challenging. To complete the task successfully, both students will need to be able to hear and produce the long and short vowels. You should allow them plenty of time to practise.

As a follow-up activity, ask them to suggest more minimal pairs based on the same sounds. Write them on the board. They can then change partners and practise the same activity once more, using these new words.

Speaking

This activity provides students with controlled practice of the language from Functional English in an interesting context. Encourage students to make use of all three expressions as well as the negative forms while doing the activity. Before they begin, present the following additional language that they will require:

x indicator is showing y.

x switch / valve is set at y.

x is in / out.



Section four – Language development

Functional English – Suggesting solutions to problems

- 1**
- 1 One solution could be to make more fuel-efficient engines.
 - 2 Another option is to start charging higher fuel taxes.
 - 3 One option would be to create a bio-diesel made of soybeans or corn.
 - 4 An alternative to that would be to make more fuel-efficient aircraft.
 - 5 Or how about having more jumbo jets that can carry hundreds of passengers?
 - 6 Alternatively, we could reduce how often we travel by plane.

Expressing expectation

- 2**
- | | |
|----------------|-------------------|
| 1 should | 6 is supposed |
| 2 is supposed | 7 should |
| 3 supposed to | 8 should |
| 4 not meant to | 9 not supposed to |
| 5 meant to | 10 shouldn't |

Vocabulary – Climate change

- 1**
- | | |
|------------------|----------------|
| 1 escaping (d) | 4 protects (b) |
| 2 atmosphere (f) | 5 rise (c) |
| 3 substances (e) | 6 breathe (a) |

Prefixes

- 2**
- | | |
|-----------------|----------------|
| 1 transatlantic | 6 abnormal |
| 2 disused | 7 outperform |
| 3 underpowered | 8 de-ice |
| 4 unrealistic | 9 restart |
| 5 inoperative | 10 overcrowded |
- 3**
- 2 misinformed
 - 3 underestimated, refuel
 - 4 overweight
 - 5 reconsider
 - 6 inaccurate
 - 7 inefficient
 - 8 misdiagnosed

Nouns for fuel

- 4**
- | | |
|------------|---------------|
| 1 tanks | 6 pressure |
| 2 capacity | 7 flow |
| 3 pumps | 8 consumption |
| 4 hoses | 9 shortage |
| 5 gauge | 10 starvation |

Missing verbs

- 5**
- | | |
|-----------------|-------------|
| 1 running | 6 prevent |
| 2 flood | 7 turned on |
| 3 Restarting | 8 cooking |
| 4 shut off | 9 popping |
| 5 shutting down | 10 leaking |



PHOTOCOPIABLE ACTIVITY

Tell students that they will take part in a debate concerning the construction of a new airport and its impact on the local community. In groups of three, ask students to read the problem. Assign each student in the group a role: 1, 2 or 3. You may either do this at random or choose the most suitable students for particular roles.

Ask students to form a group with the other students who have been assigned the same role. They should spend 5–10 minutes brainstorming the various arguments that they can use to support their viewpoint. Students who have the role of the concerned parent should write some questions to ask the environmentalist and the local businessman. They may decide to support one side or the other depending upon the answers they receive.

Reorganize the students into their original groups. Ask them to debate the proposal and to try and convince the others in the group to change their minds. This activity may last around 10–15 minutes.



The airport debate

Read the problem and take one of the three roles that your teacher assigns you.

The problem

Imagine that you live in a medium-sized city with a population of half a million people. The city is served by an airport which was originally constructed 60 years ago. At that time the airport was in the countryside, but it is now inside the city limits. Both domestic and international flights arrive at the airport. It is not a large airport and the number of flights are limited. However, it can be congested at times, particularly in the summer months. International visitors to your city come for both business and pleasure. Local politicians believe that more tourists and business people would visit the city if improved airport facilities and more flights could be provided.

There is a proposal for the construction of a new international airport in the countryside, 40 km outside the city, which will be connected to the city centre by the construction of a high-speed rail link. Local opinion is divided on this proposal.

Role 1

The environmentalist: You are strongly against this proposal. It will cost a lot of money which is needed elsewhere and it will destroy an area of beautiful countryside. It will also disturb some people who have chosen to live in the countryside. You believe the harmful effects of aviation on the environment are numerous and well-known.

Role 2

The local businessman: You are firmly in favour of the proposal. You believe that the local economy will develop rapidly as soon as the proposal is accepted. Better transport links for your city are essential if the city is to continue to grow and develop. The prestige of your city will rise and your own company is likely to grow and make more money.

Role 3

The concerned parent: You are the parent of three young children. You are not sure what to think about the proposal. You have heard that it will have a positive effect on the local economy and you want your children to have better employment opportunities when they grow up. On the other hand, you are concerned about serious global environmental issues, and you have heard that civil aviation may be responsible for many of the problems.

PRESSURIZATION AND DEPRESSURIZATION

Introduction

In the late 1930s, researchers began to explore the possibility of flying at altitudes much higher than had previously been thought possible. They felt that this would improve passenger comfort (flights would be less affected by wind and other meteorological factors), that aircraft would be able to travel faster (less drag at higher altitudes) and that aircraft would therefore have a longer range, that is they could travel further. This led to the introduction of **pressurized** airliners, which began flying passengers in the 1940s. Although taken for granted nowadays, pressurized airliners were a revolutionary development at the time.

Pressurization and depressurization

When an aircraft climbs above about 10,000 ft, its passengers require extra oxygen if they are to remain at the higher altitude for any length of time. In early solo attempts to fly at higher altitudes, extra oxygen was supplied to the pilot, through an **oxygen mask**. Following the success of these attempts work started on providing a system of **cabin pressurization** for commercial air transport. Early systems were manually controlled by the flight engineer but it wasn't long before fully automatic systems were introduced. Nowadays, pressurization is a standard feature of commercial passenger aircraft. You might typically be cruising at 30,000 ft but inside the cabin the air pressure experienced will be approximately equivalent to the pressure experienced when flying at around 7,500 ft. The cabin pressure could be set lower, equivalent to pressure at sea level for example, but too great a pressure differential between the inside and outside of the aircraft can cause **metal fatigue**. The new Boeing 787 currently claims to be able to provide cabin pressure equivalent to flight at 6,000 ft. According to the manufacturers, this will provide a noticeable improvement in comfort on a long flight.

Most passengers on board an aircraft are probably not aware of the way in which pressurization works. However, many people do experience some discomfort as an aircraft climbs or descends, for example, when their 'ears pop'. This is a reaction to the changing pressure within the cabin as the cabin **pressurizes** (after take-off) or **depressurizes** (prior to landing). While cruising, cabin pressure will normally be constant.

Normally a passenger airplane pressurizes as it climbs without the pilots having to do anything. If the system is not

working for any reason, an alarm in the cockpit will alert the pilots. Once alerted, the pilots will not climb above 10,000 ft until the problem is resolved.

If an aircraft happens to be at its cruising level when something goes wrong, then once again the pilots will be alerted immediately of the **depressurization** or **decompression** being experienced. The procedure to be followed is quite routine but it is of critical importance that everyone acts quickly. Oxygen masks drop down automatically in front of passengers at the same time as the pilots are alerted to the danger. Passengers, pilots and cabin crew need to put on their masks immediately. Failure to do so can result in a rapid loss of consciousness. This is why in the **safety briefing** before take-off, parents are told to put on their own masks before attending to their children. The pilot will then request an immediate **emergency descent** from air traffic control to 10,000 ft – a safe level for flying without supplementary oxygen. Passengers will probably find the experience rather frightening but if procedure is properly followed, and assuming there is no other major problem with the aircraft, then there is no significant danger. The pilots will try to solve the problem once they have reached a safe altitude. They may continue flying at this low altitude if they are not too far from their destination, or they may choose to divert to another airport.

Oxygen generators on board typically provide about ten minutes supplementary oxygen supply for each passenger. The pilot should have no difficulty descending within this time. To carry more oxygen on board than is necessary simply adds unnecessary weight. However, flights over mountainous areas are more problematic. If the mountain range is high (imagine the Himalayas for example, which can be over 20,000 ft) a straightforward descent to 10,000 ft becomes impossible. The pilot will need to choose a heading which takes the aircraft away from the mountains altogether. This may take considerably longer than ten minutes. It is a critical factor in planning a flight over such terrain. The time needed to descend the airplane in the worst-case scenario (depressurization could happen anywhere) needs to be calculated and oxygen for the corresponding time period (plus a little extra) needs to be carried for each passenger. The pilots should also have clearly marked on their flight planning, at each point along the route, the optimal heading to take should an emergency descent prove necessary. Inexperienced pilots or aircraft which are not properly equipped will need to avoid such mountainous areas altogether, taking a longer more circular route.



Reasons for sudden decompression

There are numerous reasons for a sudden rapid decompression on an aircraft. It may be as a result of an underlying structural problem such as metal fatigue. Alternatively an in-flight event such as a serious bird strike or a meteorological event such as a hailstorm may cause the problem (see the incident in Section 3). In extreme cases where a hole appears in the aircraft, passengers or crew have been known to have been sucked out. Such events are extremely rare, but when such a serious event occurs a pilot will need not only to descend rapidly, but to plan an emergency landing as soon as possible. The story featured in Section 1 was one such famous case in which the pilot was lucky to survive.

Incidents of aircraft being damaged by being hit by airport vehicles which are servicing them **on the ramp** (the area where they park between landing and take-off) are unfortunately rather common. This is a major problem for airlines, because even the smallest scratch or dent in an aircraft's **fuselage** (the main body of the aircraft) has to be properly investigated as it could cause decompression. While the new Boeing 787 has been innovative in its use of **composite materials** (materials which offer significant weight-saving) for most of its structure, critics have suggested that these new materials may tear more easily, increasing the possibility of ramp damage.

Confusion in the cockpit

In August 2005, a Boeing 737 crashed near Athens. Preliminary investigations soon identified the failure of the airplane to pressurize after take-off as the main cause of this accident. It is thought that a pressurization switch was left out of position after maintenance the night before and that the pilots missed this problem when performing their pre-flight checks. Once the aircraft had climbed to 10,000 ft an alarm went off in the cockpit to warn the pilots that the aircraft was not pressurizing. However, the pilots believed that the alarm related to something else of no real importance. They were further distracted by another alarm which was sounding, concerning a relatively unimportant matter. As the aircraft continued to climb on autopilot, both pilots became increasingly disoriented due to lack of oxygen and began to suffer from **hypoxia** (they had not put on their masks, not realizing the serious danger they faced). Before long they both lost consciousness. The aircraft continued as far as Athens on autopilot, escorted by military jets who at first feared a terrorist attack when contact was lost with the crew. It entered a holding pattern and circled until it ran out of fuel and crashed.

An additional factor possibly contributing to this accident is thought to have been the difficulties the two pilots had in communicating in English in a stressful situation (one pilot was German and the other Cypriot). Some safety experts believe that solving complex technical problems in the cockpit requires that pilots share the same first language.

for fun

The search for a pilot ...

While taxiing to the runway, an aircraft stopped, turned around and returned to the stand. Passengers waited an hour before the airplane finally took off. One of them asked the flight attendant what had caused the problem.

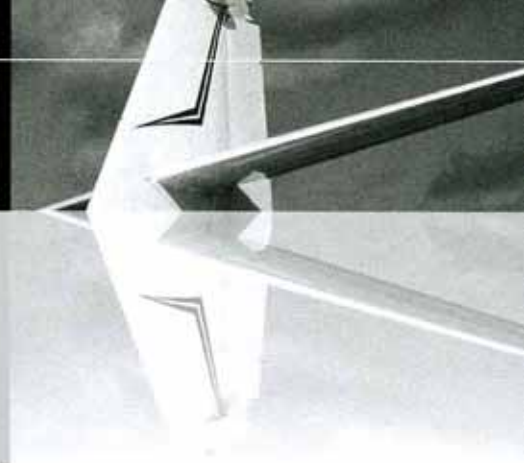
'The pilot didn't like the sound of a noise he heard from the engine,' replied the flight attendant, 'and it took us an hour to find a new pilot.'

A pilot always has the final decision and responsibility for whether an aircraft is ready to take off or not. In reality, no reputable airline would behave like this, but even if they tried to, pilots have a great sense of solidarity and would support their colleague in the decision not to fly that aircraft.

PRESSURE

Section one - Blast

This section deals with a dramatic incident of sudden decompression in which a captain was sucked out of the cockpit, yet managed to survive. The section teaches the vocabulary of action verbs and the language function of expressing time and duration.



- 1 A widely publicized case of sudden decompression was the crash near Athens of a charter flight, in which there were no survivors. Students are likely to mention this accident, although they may not know what exactly happened (see the introductory notes for an explanation). Another well-known case which they might mention is the incident featured in this section, though again they may not know many of the details. You can tell them they will be reading a detailed account of the incident.

Other less serious incidents may be mentioned, and students are likely to point out that the deployment of oxygen masks in the cockpit and cabin coupled with a quick descent to around 10,000 feet are required in any such incident.

- 2 This story is entirely true, even if it seems difficult to believe.

1 F 2 F 3 T 4 T

- 3 Note that the term *flight attendant* instead of *steward* is often preferred these days. The *chief steward* is more likely nowadays to be called the *purser* or the *cabin crew manager*.

All commercial aircraft fly with at least two pilots. The captain has the final word in the case where they don't agree on a course of action. The co-pilot is usually less experienced but sometimes, as in this incident, has to assume full responsibility.

Name	position
Nigel	steward
John	chief steward
Alistair	co-pilot
Tim	pilot

- 4 Students may need to read the text a second time in order to find the answers to these questions. Note the difficulties that the co-pilot faced (Question 5). While Nigel, the steward, who saved the captain's life was rightly hailed as a hero, the co-pilot and the chief steward were no less heroic.

- 1 It was disabled by the captain's legs.
- 2 John, the chief steward
- 3 He was still strapped in from take-off.
- 4 To get down to a level where there was more oxygen.
- 5 He was flying alone, he didn't know the airport and he had no charts.
- 6 hungry

- 5 Try to encourage students to do this activity from memory, using logical deductions and only looking back at the text if absolutely necessary.

If you have time, you could ask the following questions:

Who was the hero of the situation?

Was there more than one hero?

How do you think the passengers felt?

What do you think the co-pilot told them?

Why do you think this incident happened?

Do you think that the captain continued his career as a pilot after this incident? What about the steward? (Both continued their careers after this incident.)

- 1 the time between take-off and the incident
- 2 the height the plane reached
- 3 the time it took to descend to 11,000 ft
- 4 the height they descended to two minutes later
- 5 the length of the runway
- 6 the time the captain was outside the plane



Vocabulary – Action verbs

- 1 The two tenses used are the past simple and the past continuous. You could briefly review these two tenses before students complete the activity.

1 blew	4 jumped	7 hanging
2 drop	5 grabbed	8 banging
3 sucked	6 wrapped	9 rushed
- 2 Ask students to work in pairs and reconstruct the story together. If they have trouble remembering the events, you could write some key words on the board to help them. You could then check answers by erasing these words and asking one pair to relate the story, while the other students listen and help as necessary.

Functional English – Expressing time and duration

- 1 Encourage students to complete this activity without looking back at the text. Let them check their answers in pairs. Only then, if there are some answers which they haven't found, allow them to look back at the text. They will learn more by trying to deduce the answers themselves rather than just searching the text for them.

Ask students if they can explain the difference between *on time* (punctual) and *in time* (it wasn't too late).

Often students confuse *during* with *for*. Again, ask if anyone can explain the difference in usage (*for* + quantity of time, e.g. *for 18 minutes*, *during* + noun (not quantified), e.g. *during the flight*).

It is also worth explaining the following points and prompting the students to make some examples of their own:

- *up to* is used when you state the maximum time a procedure might take.
- *within* is used to say that an event occurs before the specified duration has expired.
- *last* and *take* are both used to express duration, the difference is that we use *take* in the construction: *take* + duration + to do something.
- When two events occur at the same time, the following construction is often used: *while* + past continuous, past simple. The past continuous is used for the action which is longer or ongoing, and the past simple for the shorter action.
- *from* + quantity of time *to* + quantity of time, is used to indicate the time limits of a period of time.

- | | | |
|----------|--------------------|---------------|
| 1 on | 4 While | 7 in time |
| 2 Within | 5 up to | 8 By the time |
| 3 took | 6 from, to, lasted | 9 During |

- 2 1 lasts 2 During 3 in time 4 within 5 from, to

Speaking

Put the class into groups of three and allocate the three roles (or let students choose for themselves). Then ask all 'journalists' to work in a group in order to discuss together the questions that they might ask. At the same time, the other two students in each group (who will play the roles of Alistair and John) can discuss which questions they expect to be asked and what they would like to say to the journalist.

Encourage students to be as creative as possible. You could feedback on the activity by asking the journalists to make a short one-minute report for TV news. The TV viewers, that is the rest of the class, could then vote on who made the most interesting report.



Section two - Damage

This section deals with structural damage to aircraft. The section teaches the vocabulary to express such damage. Students also listen to a workshop discussion on the subject of decompression and damage which might cause or result from sudden decompression. The section also teaches the language function of summarizing and the pronunciation of diphthongs.

- 1 Give students time to complete the activity in pairs before checking answers with the class.

(Suggested answers)

- 1 L
- 2 F, L
- 3 W
- 4 F
- 5 F
- 6 W
- 7 W
- 8 F
- 9 L
- 10 L

- 2 29,30 This first activity checks that students understand the main ideas from the discussion.

- 1 In a workshop on depressurization
- 2 Incidents of sudden / explosive depressurization
- 3 Damage that caused or was caused by sudden / explosive depressurization

- 3 29,30 Before students listen again, ask them to read the types of damage listed and check they understand the vocabulary.

Note that *spoilers* are moveable parts of each wing which are raised together in order to increase drag and therefore to lower airspeed. The *leading edge* is the front edge of the wing, the rear edge is termed the *trailing edge*.

The two not mentioned are: cargo door blown off and buckled tailplane.

- 4 If students are unsure of their answers, play the recording once more for them to check.

- 1 b 2 a 3 a 4 a 5 b

29 Listening script

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 Birdstrike.

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 Listening script

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.



Functional English – Summarizing

- 1 29 If you think your students will find this activity difficult, get them to work in pairs. Ask them to read through the summaries before playing the recording.

The best summary is e.

- 2 / 3 30 Play the recording for students to make notes of the main points. If necessary, check answers before getting students to write their summaries. After comparing the content of the summaries, you could get students to correct their partner's summary, checking for spelling and grammar.

Pronunciation – Diphthongs

- 1 Model the pronunciation of the seven diphthongs for your students and allow them to practise making these sounds too.

Ask them to underline all the words which have similar sounds to those practised. It doesn't matter if they don't find all of the examples in the text, as long as they have been able to identify some examples. If you think your students will find this activity challenging, you could complete it with the class, reading each sentence and eliciting the examples.

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 Students listen to the single words from the text and write them in the correct columns. If they find this activity difficult, play the recording twice. Then play the recording again while the students practise saying the words.

You could end this activity by asking students to add one or two more words to each column. You could make this more of a challenge by specifying that the words they add must be aeronautical, or that they must have been taught as vocabulary in this book.

/aɪ/	/eɪ/	/ɔɪ/	/ɪə/	/əʊ/	/aʊ/	/eə/
flight	take		real	scenarios	now	aircraft
depressurization	away		series	photographs	out	
minor	tailplane		here	cargo		
	depressurization		rear	only		
	safely			zero		

31 Listening script

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

Speaking

In answer to Question 1, materials are chosen for lightness and strength, plus flexibility (ability to bend) or rigidity (ability to not bend) depending on the part. Typical materials include aluminium, carbon fibre, fibreglass, steel, titanium.

In answer to Question 2, routine and detailed maintenance checks on the outer structure of aircraft are obligatory, usually after around 100 hours of flight. The precise frequency of these checks depends on the type and the age of the aircraft concerned. In addition to such detailed checks, pilots are required to perform a visual check before every flight (sometimes a ground engineer will do this for them).



Section three – Emergency descent

This section deals with a serious incident of sudden decompression. The section presents the pronunciation skill of contrastive stress and the language function of expressing consequences.

- 1 Oxygen masks need to be deployed immediately and both crew and passengers must put on their masks without delay. It is essential that passengers travelling with children put on their own masks first, before attending to their children. While this is explained to all passengers during the safety briefing before take-off, they will need to be reminded if such a situation occurs.

Pilots will then make plans for an immediate and fast descent to an altitude of around 10,000 feet, where supplementary oxygen is no longer necessary. The oxygen supply available for each passenger will normally last for ten minutes. ATC need to be informed as they will always give priority to an aircraft which needs to descend in such circumstances.

- 2 32 Note that this incident occurred because the aircraft was caught in a hailstorm. Pilots will do whatever they can to avoid flying through a hailstorm as there is a high risk of resulting structural damage.

- 1 He wants to make an emergency landing.
- 2 a hailstorm
- 3 three (the captain and two passengers)

32 Listening script

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.



3 32

- 1 controller, pilot
- 2 40
- 3 consciousness
- 4 11
- 5 leading edges, engine
- 6 bleeding heavily
- 7 windshield, tail

Pronunciation – Contrastive stress

- 1 An understanding of the way in which contrastive stress works will greatly aid pilots and controllers when they need to clarify messages which may initially have been misunderstood.
- 2 33 When students are practising these examples, encourage them to exaggerate the stress on the two words they wish to contrast. It is better that they do this, in which case they will be clearly understood, rather than run the risk of their message not being sufficiently clear.
 - 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.

33 Listening script

- 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.

- 3 This activity offers the students the opportunity for controlled practice of the above pronunciation feature. Once again, encourage them to exaggerate the stress patterns involved.

Functional English – Expressing consequences

- 1 34 Ask the students which words they think will fit in each statement before they listen. After they listen to check their answers, ask them how they would explain the meaning of *unless* and *otherwise*. If necessary explain that *unless* means *if ... not* (a negative condition) and *otherwise* means *or (else)*. Note that *otherwise* is often followed by a statement of the negative consequences that will occur if something doesn't happen.

- 1 unless
- 2 otherwise
- 3 if

34 Listening script

- 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.

- 2 This activity provides further controlled practice of *if*, *otherwise* and *unless*.
 - 1 otherwise
 - 2 unless
 - 3 if
 - 4 otherwise
 - 5 unless
 - 6 unless
 - 7 if
- 3 This activity provides free practice of *if*, *otherwise* and *unless*. Encourage students to make full use of all three structures when expressing their ideas.

The statements are interesting propositions which may generate a lot of discussion. If the activity works well, you can extend it by asking pairs of students to form groups of four and attempt to reach a consensus on as many of the points as possible. You can then end the activity by seeing if you can obtain a class consensus on some of the issues.

Speaking

Both of the emergency situations allow students to make use of language which has been presented throughout the unit. Encourage students playing the role of pilots to invent some extra details if they feel confident enough to do so. You might also encourage those playing the role of controllers to misunderstand some details, which will give the pilots the opportunity to use contrastive stress for clarification.

If the students have dealt with both situations without difficulty, you could ask them to create their own scenarios and perhaps perform them for the class.



Section four – Language development

Functional English – Expressing time and duration

- 1**
- | | |
|---------------|-------------|
| 1 on time | 6 in time |
| 2 up to | 7 within |
| 3 By the time | 8 lasted |
| 4 takes | 9 While |
| 5 during | 10 from, to |
- 2**
- | | |
|--------------|------------|
| 1 waste | 5 make |
| 2 spend | 6 managing |
| 3 run out of | 7 lose |
| 4 have | 8 take |

Expressing consequences

- 3**
- | | |
|-------------|-------------|
| 1 if | 5 If |
| 2 Unless | 6 unless |
| 3 otherwise | 7 otherwise |
| 4 unless | 8 if |

Articles

- | | | | |
|-------|--------|--------|--------|
| 1 a | 6 the | 11 the | 16 the |
| 2 the | 7 The | 12 the | 17 The |
| 3 the | 8 a | 13 The | 18 an |
| 4 a | 9 the | 14 an | |
| 5 the | 10 the | 15 a | |

Vocabulary – Action verbs

- 1**
- | | | | |
|-----|-----|-----|-----|
| 1 c | 3 d | 5 a | 7 e |
| 2 h | 4 g | 6 b | 8 f |

Verbs describing damage

- 2**
- | |
|-------------------------------|
| 1 blew out |
| 2 smashed into |
| 3 corrosion, metal fatigue |
| 4 tore away from, cutting off |
| 5 buckled |
| 6 dented, punctured |
| 7 broke through, smashed |

PHOTOCOPIABLE ACTIVITY

This report summarizes the main events which led to the crash of a Boeing 737 flight in August 2005 near Athens. Your students will probably be aware of this accident and its main cause.

The first activity provides a general vocabulary review as well as checking that the students have understood the details of the report.

The second activity offers the possibility of a debate if there are opposing viewpoints within the class. This accident would seem to suggest that a linguistic mix in the cockpit can be dangerous. On the other hand, there is no firm evidence to suggest that this caused the accident and some highly respected airlines already have mixed cockpits.

Finally if you have time, ask students to cover the report and practise retelling the story, focusing on correct use of the past simple and past continuous tenses.

Key

- | | | | | | |
|---------------|----------------|------------|-----------------|------------|------------------|
| 1 pressurize | 3 checks | 5 masks | 7 oxygen | 9 military | 11 starvation |
| 2 maintenance | 4 pressurizing | 6 sounding | 8 consciousness | 10 holding | 12 communicating |



- 1 Complete the report below using words from the box.

checks communicating consciousness holding maintenance masks
military oxygen pressurize pressurizing sounding starvation

Air craft failed to pressurize

In August 2005, a Boeing 737 crashed near Athens. There were no survivors among the 115 passengers and six crew members on board. Investigations soon identified the failure of the plane to (1) _____ after take-off as the main cause of this accident. The pressurization switch should be set to 'Auto' before take-off. It had been left out of position during (2) _____ the night before, and the pilots did not notice this problem while performing their pre-flight (3) _____. Once the aircraft had climbed to 10,000 feet, an alarm went off in the cockpit to warn the pilots that the aircraft was not (4) _____. However, the pilots mistakenly believed that the alarm was the take-off configuration warning, and they switched it off.

After the aircraft had climbed above 14,000 feet, oxygen (5) _____ were automatically deployed in the cabin. There was a warning light in the cockpit to show that this had occurred, but the pilots were distracted by another alarm which was (6) _____ and which they believed signified an equipment cooling system problem. As the aircraft continued to climb on autopilot, both pilots became disoriented and began to suffer from hypoxia, due to their lack of (7) _____. There is no indication in the pilots' communications with air traffic controllers that they had any idea of the danger they faced. If they had realized, they would certainly have put on their oxygen masks in time to begin an emergency descent and then, once at a safe level, they would have tried to determine why the aircraft had not pressurized.

Within a few minutes, both pilots had lost (8) _____. The aircraft continued as far as Athens on autopilot, escorted by (9) _____ jets. When contact was lost with the crew, the authorities feared a terrorist attack. The aircraft entered a (10) _____ pattern and circled until both engines flamed out due to fuel (11) _____. It then crashed into a hillside about 40 km from Athens.

One pilot was German and the other Cypriot. An additional factor contributing to this accident could be the difficulty the two pilots had (12) _____ in English in a stressful situation. The lack of oxygen could only have made things worse.

- 2 Some safety experts believe that solving complex technical problems in the cockpit requires that pilots share the same first language. Do you agree?
- 3 Do you believe that there should be an international regulation stating that a flight crew must share the same first language?

Introduction

Aviation has been a target for terrorists for many years. Despite continuous improvements in security procedures making it increasingly difficult to mount an attack on a civilian aircraft, the fear still exists that terrorists will always try to target aircraft because of aviation's high profile and the resulting publicity to be gained. Security is likely to be a key concern for airlines for many years to come.

The first attacks on airliners in the 1960s and 1970s were almost always **hijackings**, with terrorists managing to smuggle weapons on board and demanding that the pilots fly them to a destination of their choice. Once there, they would seek asylum or make political demands threatening to kill some or all of the passengers if these demands were not met. Such hijackings caused a lot of fear and sometimes resulted in the loss of many lives. They only subsided when airport security measures were sufficiently enhanced to effectively prevent the smuggling of weapons on board.

In 1981, a bomb exploded on a flight as it flew over Lockerbie in Scotland, killing everyone on board and a further eleven people on the ground. It was subsequently discovered that the bomb had been placed in a suitcase in the hold, checked in by a passenger who had been due to board the aircraft in Frankfurt but who had not done so. To prevent any repeat of such a horrific attack, authorities worldwide outlawed the carrying on board of any baggage which isn't accompanied by the passenger who had checked it in, a rule still in place today. This is why aircraft are often delayed by having to **offload baggage** at the last minute. While the reasons for a passenger not boarding a flight they have checked in for are almost always innocent (they may just be late reaching the gate), removing their baggage is undoubtedly a prudent precaution.

The above-mentioned precaution, however, is obviously insufficient to prevent a suicide attack. Ever since September 11, 2001, security fears have centred around such attacks. As well as being prepared to die themselves, the September 11 hijackers were capable of **piloting** the airplanes and using them as extremely lethal weapons. It was this latter aspect of the attacks which took virtually everyone by surprise and resulted in a major rethinking of security procedures.

Security precautions

Since September 11, security has become much tighter. Many of the new precautions are clearly visible to passengers, with new rules as to what may be carried on board. Anything which could possibly be used as a weapon, even nail scissors, is

strictly forbidden in the cabin. Much stricter controls are carried out on the identity of passengers, with authorities ready to use fingerprinting or biometric profiling as an extra security precaution. All baggage entering the hold is systematically screened for any signs of explosive materials, through the use of explosive detection machines. The assumption nowadays is that terrorists are not afraid to blow up an aircraft they are travelling on themselves. A rule is now in place banning liquids (except for very small quantities carried in transparent bags) on all flights to or from an EU airport. This measure was introduced to prevent the possibility that liquids would be carried on board by different people and then mixed together to create an explosive device.

Anonymous armed **air marshals** operate on board aircraft in the US. While they existed prior to September 11, the US government was quick to recruit many more shortly afterwards and to declare their presence in order to deter terrorist attacks. When the British government considered their use they were met with an angry reaction on the part of the British Airline Pilots Association who claimed that having any guns on board would be counterproductive. For one thing they feared the risks of the **depressurization** that a stray bullet might cause and they also pointed out that terrorists might try to identify air marshals and seize their weapons.

Suspicious behaviour is no longer tolerated (see Section 2). Any passenger who seems to be acting in a way that suggests to security personnel that they have something to hide will be prevented from boarding a flight. In almost all such cases the passenger turns out to be innocent, but no airline wants to take the risk of suspicious behaviour once airborne as this would result in a costly diversion. Numerous cases of suspicious behaviour which starts in the air have likewise almost always had an innocent explanation, but the flight crew who choose to make a precautionary diversion are praised for their prudence.

Shoulder-launched missiles are considered to be a plausible threat to aircraft and this is why **perimeter fencing patrols** have been stepped up at airports. Military aircraft are routinely fitted with **anti-missile defence systems** and the same technology could be used on civilian aircraft as well, but it is expensive and for the moment there do not seem to be any plans to make this a standard feature.

Cockpit doors have been reinforced and are now locked during flight. No visitors to the cockpit are allowed.

The lessons of the past have led those responsible for the security of civil aviation to attempt to stay one step ahead of terrorists by predicting future threats and responding before these threats become a reality.



Air rage

Aggressive behaviour or air rage can be a major problem on board an aircraft, presenting a threat at times to the cabin crew or other passengers, or even more seriously, to the safe operation of a flight. There are several reasons why the experience of flying itself might cause a passenger to behave in such a way. The feeling of being enclosed, the stress of the pre-flight check-in and security procedures, the stress caused by any delay, a fear of flying or the side effects of any drugs or alcohol the passenger may have consumed are all possible causes of subsequent unreasonable behaviour on board. A passenger may also have an underlying mental health problem which becomes worse when they are subjected to the stress of flying.

The consequences of antisocial or aggressive behaviour during a flight can be serious. Apart from the actual harm unruly passengers may cause to themselves or others,

the pilots might decide that a diversion is necessary in the interests of the safety of all on board (as in the incident in Section 3). This will be costly for the airline. Unruly passengers can expect to be arrested once on the ground and may face serious legal repercussions. Increasingly, prison sentences, sometimes lengthy, are handed out to act as a deterrent.

The main precaution that an airline can take is to stop any passengers who exhibit signs of unruly behaviour on the ground from boarding. Passengers who are drunk, for example, can often be identified and stopped at the gate. Many airlines serve less alcohol on board than they used to, or even no alcohol at all, particularly on short haul flights. But unruly behaviour has many other causes which can often not be detected until it is too late. Cabin crew undergo training as to how to respond to unruly behaviour on board in an effort to contain the problem before it becomes too serious and a diversion becomes necessary.

for fun



One way to remain calm ...

A security alert at the airport had meant that passengers had spent several hours queuing at the check-in desk and the flight was way behind schedule. An angry passenger was complaining to the check-in agent about everything. The agent remained cool and polite and continued to smile. Once the difficult passenger had finally been checked in, the following passenger complimented the check-in agent on her polite behaviour. 'No problem' said the agent, 'that guy is going to Frankfurt and his bag is going to Buenos Aires.'

SECURITY

Section one – Air rage

This section deals with the phenomenon known as air rage. It presents the vocabulary needed to talk about conflict and restraint. It also teaches the language function of focusing on actions by using the passive form of verbs.

- For some information about what the students might say, refer to *Air rage* in the introductory notes for this unit.
- The word *inebriated* (meaning drunk) may need to be explained and students might also need to know that *jail* (see Headline 3) can be a verb meaning *go to prison*.

You might also need to explain the following words:

A: *unruly, to handcuff*

B: *to harass, to intervene, to restrain, plasticuffs, disturbance*

C: *to swear*

D: *to abuse, to abandon*

Allow students to read the reports first before you deal with this vocabulary. Some students may already know the meanings of the above words. If so, encourage them to paraphrase the words and explain them to the rest of the class.

For words that nobody knows, encourage students to guess the meanings from the context. Be prepared to explain the meanings yourself if this proves necessary, but the contexts are clear and there is a good chance someone will be able to guess correctly.

While the above techniques take longer than the teacher simply explaining the meanings, students are more likely to remember vocabulary that they have been involved in explaining themselves.

1 D 2 C 3 B 4 A

- Students may not know the term *offensive language* or the verb *to assault*. If so, you can try one of the above techniques for teaching vocabulary.

1 C 2 D 3 B 4 D 5 C 6 B 7 A 8 A

Vocabulary – Conflict and restraint

This activity provides a useful check that the students have acquired the target vocabulary.

After students have completed the activity, check that they have understood the key vocabulary. Write the following expressions on the board:

become agitated, become violent, behave in a violent way, bite somebody, create a disturbance, kick somebody, put plasticuffs on a passenger, refuse to cooperate, remove a passenger, restrain a passenger

Ask students to sort these expressions into three categories: *Behaviour likely to lead to conflict* / *Direct physical attack* / *Measures to restrain a violent passenger*. After checking answers, elicit from your students any other words or expressions which could be added to these categories.

(Answers)

Behaviour likely to lead to conflict: become agitated, become violent, behave in a violent way, create a disturbance, refuse to cooperate

Direct physical attack: bite somebody, kick somebody

Measures to restrain a violent passenger: put plasticuffs on somebody, restrain a passenger, remove a passenger

1 d 2 j 3 f 4 h 5 i 6 c 7 a 8 b 9 e 10 g



Functional English – Focusing on actions

You could supplement the explanation by discussing the formation of different tenses in the passive:

Present simple: *(am / is / are) + past participle*

Present perfect: *(has / have) been + past participle*

Future simple: *will + passive infinitive*

Highlight also the formation and use of the passive infinitive:

Passive infinitive: *(to) be + past participle*

Note: this is used after *will* or *going to*, after all modal structures or after any other structure which takes an infinitive.

- 2 Plastic restraints are kept on all flights to deal with violence on board.
- 3 Training is given to cabin crew for dealing with aggressive passengers. / Cabin crew are given training for dealing with aggressive passengers.
- 4 A belt was used to restrain the passenger.
- 5 The passengers were not allowed to board the flight because they were drunk.
- 6 This flight has been diverted and will be landing shortly.
- 7 The passenger will be arrested as soon as we land.

Speaking

This speaking activity allows students to express their views. It will be interesting if they have some personal experiences to share, or if they have heard of any particular incidents of air rage.



Section two – Suspicious passengers

This section deals with the measures that can be taken on the ground to identify any passengers who might cause trouble on board an aircraft. It teaches vocabulary relating to strange behaviour, as well as the language function of expressing possibility and probability. The section also presents and practises the correct pronunciation of words ending in *-ion*.

- 1 Your students may not know a lot about either the surveillance techniques involved in identifying suspicious passengers, or the body language which is associated with such passengers. As controllers or pilots they are not involved in this area of work. Nevertheless, it will be interesting to allow them to speculate and they will find out what actually happens in the listening activity which follows.
- 2 35 While students are listening to this talk for the first time, ask them to note down as many of the features of suspicious body language as they can. They may not know the terms *eyebrows*, *palms* or *the pitch of one's voice*. Allow them to try and guess, but be ready to explain the meanings if necessary. The body language that the expert talks about is rather surprising for those who do not work in this area. Your students may find that he doesn't actually mention any of their ideas.

35 Listening script

P = presenter, KK = Kalle Kaub – 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.



- 3 35 If your students didn't find the first listening difficult, ask them to try these questions before listening again to check. If they found it difficult, play the recording once more and ask the students to listen for the answers.

- 1 It's not enough on its own.
- 2 Because they are under stress.
- 3 lips, eyebrows, nose
- 4 They make friendly eye contact or start a casual conversation with the passenger.
- 5 body search, inspection of carry-on baggage, police questioning
- 6 immigration violations, drug possession

Vocabulary – Strange behaviour

The vocabulary in the box should now be familiar to the students, so you can ask them to do this activity without any introductory explanation. When they finish, point out the following expressions which they may wish to memorize:

make (friendly) eye contact with

react normally

a (common) sign of (aggressive behaviour / stress)

undergo a body search

- 1 eye
- 2 body
- 3 leg
- 4 head
- 5 lips
- 6 hand, palms
- 7 voice

Functional English – Expressing possibility and probability

- 1 / 2 35 To check that students have understood the concepts correctly, you could ask them how they would express the words listed in percentage terms:

- *might / may / could* – less than 50%
Note: Adding stress to these words implies a more remote possibility.
- *probably* – around 70–90%
- *must* – 100%, sometimes just a little lower
- *can't* – 0%

- 1 could, might
- 2 are probably not
- 3 must
- 4 may
- 5 can't
- 6 can't, might

- 3 This activity allows students not only to practise the above language function in a controlled way, but also to be creative in their use of the structures. The context reviews the main subject of the unit, a discussion of passengers whose behaviour may be considered suspicious.

Pronunciation – -tion, -sion, -cion endings

- 1 36 After students have completed the activity, point out that there are not many concrete rules for knowing which syllable of a word should be stressed in English. This, however, is one example of an area where a clear rule exists. All words ending in *-ion* have the main word stress on the penultimate syllable.

- 1 /fɪn/
- 2 the second

36 Listening script

detection possession suspicion

- 2 37 You may wish to teach your students about secondary stress at this point. Words with four or more syllables in English usually have both a primary and a secondary stress. All the words in the recording have their primary stress on the penultimate syllable, but *aviation*, *conversation*, *immigration* and *violations* also carry a secondary stress on their first syllables.

aviation
reaction
conversation
immigration
inspection
intentions
reduction
violations

37 Listening script

aviation	immigration	reduction
reaction	inspection	violations
conversation	intentions	

Speaking

- 1 Allow students to look through the list of possibilities and encourage them to ask you about any expressions they don't understand.

Students may point out that certain security measures, such as baggage inspections, are obligatory at all airports. Accept such suggestions and tell students that this means that they will have less points to spend on the optional choices.

- 2 In a large class you may need to form two or three groups. Emphasize that students are part of a team and that they must reach a consensus, even if this means that some students will have to compromise. You could also ask each group to present their solutions and have the class vote on which one they think is best.



Section three - Unlawful interference

This section deals with an incident in which a passenger becomes violent on board and the flight crew decide that they need to divert. The section reviews appropriate pausing and stress patterns in continuous speech. It also teaches the language function of reported speech.

- 1 As the picture suggests, cockpit doors have now been reinforced. This was a clear recommendation which followed the events of September 11, 2001. The cockpit door is locked during flight and no unauthorized personnel are allowed to enter for any reason.
- 2 38 Note that the flight crew believe that this is a problem of mental health. This seems a reasonable assumption. The other possibility, also suggested in the recording, is that the passenger is drunk.
 - 1 violent
 - 2 Korean
 - 3 divert and land

- 3 38 If students found the listening activity easy, you could get them to answer these questions before listening for a second time to check.

When they finish this activity, ask them if they believe that the flight crew were right in their decision to divert. They will probably agree on the grounds that safety always comes first. The passenger was restrained though, so it may have been possible to continue to their destination.

- 1 He hits a flight attendant.
- 2 Flight attendants force him to the floor and handcuff him.
- 3 They think he has a mental health problem.
- 4 Secure him away from other passengers.
- 5 medical and security
- 6 178
- 7 at 47

38 Listening script

PNF = pilot non-flying, **PF** = pilot flying,
FA = flight attendant, **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.

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. (U)

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.



Pronunciation – Information groups and stress

1 / 2 / 3 38 The students have already worked on information groups in Unit 10 and they have worked on stress patterns throughout the course. This activity is therefore a review and a useful check on what improvements students have made in their pronunciation during the course. Assuming that they have made some improvement, try to give your students some positive feedback on this point. Students often lack confidence in the area of pronunciation.

Note that the pauses as well as the stressed syllables that students have marked may be different from the suggested answer. Be prepared to accept alternative answers if they seem to be reasonable suggestions.

(Suggested answers)

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 /

ACC 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 /

ACC Interflight 547 / you are approaching Korean airspace / contact Inchon control on 123.6 / I'll advise them of your situation and pass on your request

Functional English – Reporting

1 / 2 38

- 1 has attempted
- 2 are
- 3 Can we
- 4 We'll need
- 5 said, had attempted
- 6 told, were
- 7 if they could
- 8 they'd need

3 After students have attempted this activity, conduct a general review of reported speech by eliciting or presenting the following rules:

- Tenses 'go back' in reported speech:
present simple → past simple
present perfect → past perfect
past simple → past perfect
present continuous → past continuous
will → *would*
can → *could*
shall → *should*
(when the original phrase was *Shall I / we ... ?*)
 - It is possible not to change the tense of the verb, particularly when speech is reported a short time afterwards and the situation referred to is still true.
 - Yes / No questions are reported using *if* but other questions retain the question words. Subject and verb are not inverted when questions are reported. Verb forms also change in questions as outlined above.
 - Commands or instructions can be reported using the following structure:
subject + *told* + object + *to* + infinitive
This structure is particularly useful for pilots and controllers who will often be reporting instructions.
- 1 The tense of the verb moves back in time.
 - 2 *Can* changes to *could* and *will* changes to *would*. *Shall* changes to *should*.
- 4**
- 1 the man (that) he had to leave the plane / the man to leave the plane
 - 2 if he / she should contact MediLink
 - 3 (that) one of their flight attendants had been injured
 - 4 the pilot to contact Inchon Control
 - 5 (that) they had an emergency in the cabin
 - 6 (that) there were three serious injuries on board
 - 7 they'd like to divert to another airfield

Speaking

- 1** At first students work in groups of three to form ten questions for the journalist to ask.
- 2** Students now adopt their different roles and perform the interview, with one of them taking sufficient notes for Activity 3.
- 3** Students now have the opportunity to fully practise the language of reported speech. They should report the questions as well as the answers.



Section four - Language development

Functional English - Passive

- 1 2 were thrown off
- 3 was assaulted
- 4 was forced
- 5 was punched
- 6 were informed
- 7 was told
- 8 was not allowed
- 9 was checked
- 10 was refuelled

Expressing possibility and probability

- 2 1 c
- 2 h
- 3 f
- 4 a
- 5 g
- 6 e
- 7 d
- 8 b

Reported speech

- 3 1 told us
- 2 refused to
- 3 we
- 4 to count
- 5 ask for
- 6 to
- 7 to state
- 8 request
- 9 us
- 10 ask, for clearance

- 4 2 The pilot told the flight attendant to place the passenger at the rear of the plane.
- 3 The passenger asked the air steward for a glass of water.
- 4 The controller asked the pilot to confirm his position.
- 5 He mentioned that he was a qualified pilot.
- 6 The pilot requested to make an emergency landing.
- 7 The pilot advised the controller that they had a problem.
- 8 The controller asked for / asked him to give more details.

Vocabulary - Physical conflict and restraint

- 1 1 malicious
 - 2 nervous
 - 3 angry
 - 4 aggressive
 - 5 agitated
 - 6 uncooperative
 - 7 abusive
 - 8 suspicious
 - 9 drunk
 - 10 unruly
- 2 1 kicking
 - 2 abuse / harass
 - 3 threatened, hit
 - 4 calm down, restrain
 - 5 punched
 - 6 handcuff, bit
 - 7 abusing
 - 8 removed

PHOTOCOPIABLE ACTIVITY

Organize students into small groups and give each group one copy of the questions. They should combine their knowledge to try and find the answers. If they have no idea at all, you could allow them to do the following for one question only:

- 1 Telephone a friend.
- 2 Ask you to remove one of the wrong answers so they have a 50 / 50 chance.

When they have done the best they can, collect their answers and give each group its score. You can then move on to the second part of the quiz, where each group writes three questions to ask the class. You could set this for homework in order to give the students the opportunity to research their questions.

Key

- 1 C
- 2 B - Aviation developed faster in Europe in the early years.
- 3 A - Louis Blériot is famous for being the first to fly the English channel, and Charles Lindbergh made the first solo flight across the Atlantic.
- 4 B - Heathrow airport was officially opened just after the end of the Second World War.
- 5 B
- 6 A - It finally entered into service seven years later, in 1976.
- 7 C
- 8 C - It made its first test flight in 2005.



1 Work in groups. Answer the questions.

AVIATION HISTORY QUIZ

- 1 **When did the Wright brothers make the first powered human flight?**
A 1899 B 1901 C 1903
- 2 **The world's first commercial passenger flights connected which two cities?**
A New York and Chicago B London and Paris C Berlin and Munich
- 3 **Who made the first non-stop flight across the Atlantic?**
A Alcock and Brown B Louis Blériot C Charles Lindenburg
- 4 **Which of the following airports is the oldest?**
A Munich – Franz Josef Strauss B London – Heathrow C Paris – Charles de Gaulle
- 5 **In which decade did pressurized passenger aircraft first begin flying?**
A in the 1930's B in the 1940s C in the 1950s
- 6 **When did Concorde make its first test flight?**
A 1969 B 1972 C 1976
- 7 **Which was the first fully fly-by-wire passenger aircraft?**
A the Boeing 737 B the Boeing 777 C the Airbus A320
- 8 **When did the Airbus A380 make its first commercial flight?**
A 2005 B 2006 C 2007

2 Write three questions of your own to ask the other groups.

- 1 _____?
A _____ B _____ C _____
- 2 _____?
A _____ B _____ C _____
- 3 _____?
A _____ B _____ C _____

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