



Section three - Bird strike

This section deals with an emergency situation after a bird strike and subsequent engine failure. The incident is a typical one in which an aircraft needs to return to the airport it has just taken off from. The section teaches the language function of saying intentions and there is further illustration of stress patterns within a sentence.

- 1 Birds are a very serious hazard and can damage almost any part of an aircraft. As well as engines, the students may mention the windshield, the wings or the fuselage.
- 2 22,23,24 Note that Sentence 1 is false because although it was a multiple strike involving four birds, at least one hit the windshield. When this happens, pilots will have difficulty seeing through the windshield afterwards (Sentence 3). This is why the pilots turned the wipers on. When one engine has to be shut down, the thrust on each side of the aircraft will be unbalanced. If pilots have a greater thrust available on the right hand side of the aircraft, they will find it much easier, and safer, to turn left only. This is the case in the incident illustrated, and this is why Sentence 4 is false.

1 F 2 T 3 T 4 F

22 Listening script

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

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

24 Listening script

- C** S27H. Say intentions.
- PNF** What are we going to do? Go around to the left?
- PF** Yes. I don't intend to land with this much fuel on board. Turn left, dump fuel and get back down.
- PNF** We're going to make a left orbit of the airfield. S27H.
- C** S27H. Can you make right turns?
- PNF** Negative sir. Right turns will be very hard. I'd prefer to turn left.
- C** S27H. Understand you are unable to make right turns. Turn left at your discretion.
- PF** OK, we need to dump fuel as soon as possible.
- PNF** We plan to dump fuel to landing weight. S27H.

23 Listening script

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



- 3** The amount of fuel on board (Question 2) is a serious problem. This aircraft has just taken off and is carrying enough fuel for the whole flight. This fuel creates extra weight and so the aircraft is too heavy to land safely. An immediate landing could be dangerous for the passengers and would probably damage the aircraft too. This is why the pilot asks the controller for permission to circle and dump fuel.

- 1 1,800 ft
- 2 194,000 kg
- 3 There is too much fuel on the aircraft.
- 4 Make a left orbit of the airfield, dump fuel and land.

Pronunciation – Sentence stress 2

- 1 / 2 / 3 / 4** 23 Before completing Activities 1 and 2, ask students the following questions:

Which words generally carry full stress in a sentence? (the important ones)

Can you understand a message if you only hear the stressed syllables? (Yes, you can usually understand the general idea.)

Note that the photocopiable activity on pp 46–47 provides further practice of sentence stress.

- 1 / 2**
- 1 That's a multiple strike!
 - 2 That was four birds!
 - 3 Engine number one is still running.
 - 4 Where's the power?
 - 5 We're rolling left.
 - 6 There's no data on the screen for engine number one.
 - 7 We need to get wings level.
 - 8 Increase thrust on number one.
 - 9 Increasing thrust.

Functional English – Saying intentions

- 1** 24 This language function needs to be used by pilots and understood by controllers. In a non-routine situation, a controller will ask a pilot, *What are your intentions?* Note that the controller tells the pilot, *Turn left at your discretion*, effectively authorizing the pilot to turn left at will. In routine flight through controlled airspace, no turn can be made unless explicitly authorized. The nature of the emergency situation means that the controller will keep other aircraft away from the area and can thus allow this pilot more freedom of movement. This is a necessary measure because the reduced control capability of the aircraft means that the pilot would find it difficult to follow precise instructions.

After students have completed this activity, write the following structures on the board and ask students what the difference in meaning is: *we're going to / we plan to / we intend to / we'd prefer to / we'd like to*.

(The first three refer to a decision already taken, the other two are more indirect and seek the approval of the controller.)

Ask students what word form follows each of the five structures (a verb in its infinitive form).

- | | |
|--------------|----------------|
| 1 intentions | 5 prefer |
| 2 going | 6 discretion |
| 3 intend | 7 're going to |
| 4 going to | |
- 2**
- | | |
|-------------|----------------|
| 1 are going | 4 going to |
| 2 to ask | 5 not planning |
| 3 plan to | 6 you going |

Speaking

This activity provides controlled practice of language learnt in the unit.



Section four – Language development

Functional English – Expressing necessity

- 1 1 cleaning
- 2 to get
- 3 repairing
- 4 to change
- 5 refueling
- 6 to come
- 7 checking
- 8 to park
- 9 replacing
- 10 to spend

Expressing preferences

- 2 (Suggested answers)
- 2 I'd rather travel on a Boeing 787 Dreamliner.
- 3 I'd prefer to make voice transmissions.
- 4 I'd like to work alone.
- 5 I want to speak my own language at work.
- 6 I'd rather fly short distances.
- 7 I'd prefer to pilot a plane without passengers.
- 8 I don't want to work shifts.
- 9 I wouldn't like dealing / to deal with a sick passenger.
- 10 I'd rather travel first class.

Explaining unknown words

- 3 1 made of (d)
- 2 something for (a)
- 3 used to (b)
- 4 something that (f)
- 5 're made (j)
- 6 used for (h)
- 7 the thing (i)
- 8 's used (e)
- 9 use to (g)
- 10 are used (c)

Saying intentions and expectations

- 4 1 Datalink is intended to assist pilots in communication.
- 2 The controller plans to clear the immediate airspace.
- 3 We aim to dump some fuel before landing.
- 4 I estimate our ETA at 1300 hours.
- 5 We expect to land in about an hour.
- 6 I'm going to inform passengers of a delay.
- 7 We're hoping to take off in the next available slot.
- 8 The airline company has every intention of starting an investigation.
- 9 Flight 245 is expected to depart at 1800 hours.
- 10 The flight attendants intend to go on strike tomorrow.

Vocabulary – Security measures

- 1 1 sniffer dog
 - 2 metal detectors
 - 3 sensor
 - 4 Traps
 - 5 security worker
 - 6 perimeter fence
 - 7 CCTV cameras
 - 8 bird scarer
 - 9 Poison
 - 10 police unit
- 2 1 strike
 - 2 injured
 - 3 collapse
 - 4 alert
 - 5 hole
 - 6 broken
 - 7 damaged
 - 8 ingestion
 - 9 scratched
 - 10 burst



PHOTOCOPIABLE ACTIVITY

This activity raises students' awareness of how much can be understood from just stressed syllables. Hand out the dialogue in which only the stressed syllables appear and give students a few minutes to read it. Then ask students to work in pairs and practise the dialogue as it appears. Reading it aloud should help them understand it.

Finally, ask them to work with their partner and try to write the dialogue in full. When they finish, give them a copy of the key, which they can then compare with what they have produced.

If the above reconstruction task seems too difficult for your students, or if time is limited, just ask students to work on one segment.



- 1 Read the following dialogue in which only the stressed syllables appear.
Can you understand what is happening?

GCS = ground crew supervisor, **ATC** = air traffic controller

<p>A</p> <p>GCS: got / prob__ / flight</p> <p>ATC: which / one ?</p> <p>GCS: one / just / pushed / back</p> <p>ATC: one / go__ / Rome ?</p> <p>GCS: right / stop / flight ?</p> <p>ATC: need / know / wrong</p> <p>GCS: think / man / hold</p> <p>ATC: what ? tell / pil__ / __turn / stand</p>	<p>B</p> <p>GCS: real__ / sorr__ / man's / found</p> <p>ATC: sure ?</p> <p>GCS: yes / left / team / make / ur__ / call</p> <p>ATC: pil__ / sure / heard / noi__</p>
	<p>C</p> <p>ATC: pil__ / right / __bout / noise</p> <p>GCS: yes ?</p> <p>ATC: dogs / __caped / cages</p>

- 2 Act out the dialogue by reading the stressed syllables with a partner.
Then discuss what you think is happening.
- 3 Working with your partner, try to write the dialogue in full.
- 4 Compare your version with the version your teacher gives you.

<p>A Key</p> <p>GCS: We've got a problem with a flight.</p> <p>ATC: Which one?</p> <p>GCS: The one that's just pushed back.</p> <p>ATC: The one going to Rome?</p> <p>GCS: That's right. Can you stop the flight?</p> <p>ATC: I need to know what's wrong.</p> <p>GCS: We think there's a man in the hold.</p> <p>ATC: What? I'll tell the pilot to return to the stand.</p>	<p>B Key</p> <p>GCS: I'm really sorry. Our man's been found.</p> <p>ATC: Are you sure?</p> <p>GCS: Yes. He left the team to make an urgent call.</p> <p>ATC: The pilot is sure he heard a noise.</p>
	<p>C Key</p> <p>ATC: The pilots were right about the noise.</p> <p>GCS: Oh yes?</p> <p>ATC: Some dogs escaped from their cages.</p>

How an airplane flies

To become airborne in the first place, an airplane requires a force that will push it up into the air. This force is known as **lift** and it is generated by the wings. An airplane moves forward as a result of the force known as **thrust**, generated by the airplane's engines. The upper surface of an airplane's wings are curved and as the airplane accelerates and moves forward along the runway, air passes over the upper and lower surfaces of the wings. The air which moves over the upper surfaces has to travel further (because of the curvature of these surfaces) and therefore moves faster. The pressure generated by faster moving air is lower than that generated by slower moving air (the **Bernoulli** principle discovered by the Swiss scientist of the same name in the 18th century). Thus it is the higher pressure under the wings which creates the lift that eventually takes the airplane into the air. For this to happen the airplane must be moving sufficiently fast so that the difference in air pressure can overcome the gravitational force pushing downwards; that is the airplane's **weight**. When an airplane reaches its **cruising** altitude, lift and weight are acting in equilibrium as are thrust and **drag**. Drag is the reactionary force created by the movement of the airplane through the air.

For manoeuvring and turning an aircraft, a pilot will rely on three basic **aerodynamical** movements, known as **roll**, **pitch** and **yaw**.

Roll is rotation around the longitudinal axis (the imaginary line from nose to tail) and is controlled by use of the **ailerons** (moveable surfaces of an aircraft's wings). There are two ailerons, one on each wing and they operate in opposite directions. When the pilot deflects the right aileron upwards the right wing will produce less lift. At the same time the left aileron deflects downwards creating greater lift on the left wing. This causes the aircraft to roll to the right. A reverse in deployment creates roll to the left.

Pitch is rotation around the lateral axis (the imaginary line connecting the **wingtips**) and is controlled by use of the **elevator**. The elevator is the moveable surface of the horizontal part of the tail. When the elevator deflects upwards the tail moves downwards and the airplane is said to be in a **nose-up** attitude. Deflecting the elevator downwards pushes the tail upwards and puts the airplane into a **nose-down** attitude.

Yaw is rotation around the vertical axis (the imaginary line running downwards through the centre of gravity of the aircraft) and is controlled by use of the **rudder**, which is the moveable surface of the vertical part of the tail. Deflecting the rudder surface to the right causes yaw to the right. Left

rudder deflection means yaw to the left. Thus the rudder on an aircraft works in the same way as the rudder on a boat or ship, from where the word originates.

These three movements are the essence of controlled flight. They do not operate in isolation and to turn an aircraft a pilot will make use of all three to some degree.

Hydraulic failure

Hydraulic failure is very serious, as it usually means that the pilot will lose the use of the moveable surfaces which are essential for proper flight control. Nevertheless, emergency solutions exist. In the incident featured in Section 3, the pilot immediately declares an emergency and plans his return to the airport. He is able to make basic turning movements by using **asymmetrical thrust** (setting the two engines to produce different degrees of thrust, whereas in a normal situation they would be in equilibrium). He has lost, however, the ability to turn with any degree of precision so it is still a precarious situation.

Partial or total hydraulic failure can also cause problems with the **landing gear** (the wheels). Even if the pilot cannot extend the landing gear, a safe landing can usually be performed but it won't be comfortable for the passengers and may cause major damage to the aircraft. For more on landing gear problems see Unit 9.

Alternative ways to fly

(a) Ultralight aircraft

Taking piloting lessons in a light aircraft at a flying club, with a view to obtaining a **PPL (Private Pilot's Licence)**, is usually a fairly expensive undertaking and outside the reach of many enthusiasts who have a strong desire to fly. The development of **ultralight** (sometimes termed **microlight**) airplanes was a response to the increasing demand for cheaper and less regulated means of flying. The safety regulations in place differ significantly from country to country and this is a barrier to cross-border flights of ultralight airplanes. In the US, for example, there is no legal requirement to undertake training or obtain a licence in order to fly an ultralight aircraft. It is, nevertheless, strongly recommended to undergo proper training. Flying ultralight aircraft can be highly dangerous if the pilot is not properly prepared and the accidents which do occur are nearly always a case of pilot error. The UK takes a very different approach from the US in choosing to strictly regulate this sector.



The ultralight aircraft featured in Section 1 of the unit, the GEN-H4, is a new and highly innovative model. Note that the article featured advises potential customers to check local regulations before purchasing, in order to ensure that they would actually be permitted to fly in their own locality. Assuming that they are, it is also interesting to note that they will have to manage the same basic aerodynamical movements of roll, pitch and yaw to control their flight.

(b) Gliders

To the uninitiated, the idea of flying an aircraft with no engines might sound highly dangerous. In fact flying a glider is one of the safest ways of becoming airborne providing certain sensible precautions are taken. When accidents occur, they often involve highly experienced glider pilots who have chosen to fly close to a mountainside in order to benefit from the strong air currents available in such areas. This is risky. For those who are less ambitious it's quite a safe leisure activity, and you can actually remain in the air for hours, should you wish, providing weather conditions are favourable.

Gliding is something every pilot needs to know about. This is because if you lose power on a single-engine airplane the only way to land is to glide downwards. Occasionally even large aircraft find themselves in such a situation. This occurred on an Airbus A330 in 2001. The flight left Toronto bound for Lisbon with 304 people on board. The pilots ran out of fuel halfway across the Atlantic (see the introduction to Unit 10 for an explanation as to how this happened). They lost nearly all hydraulic control as a result and had to rely on a minimal backup system. With no power they found

themselves almost 100 miles from the nearest land (the Azores). Incredibly they were able to glide their Airbus 330 to a safe landing, with no casualties other than a few minor injuries. This incident demonstrated the value of training pilots for highly unusual and extreme situations.

(c) Aerobatics

Aerobatics is a sport in which flying manoeuvres are demonstrated, sometimes to entertain the public. Aerobatic displays may be performed by military pilots or by civilians. For military fighter pilots the ability to perform aerobatic manoeuvres is part of their training. Aerobatic displays may involve individual aircraft where the full range of manoeuvres may be attempted or a group of airplanes flying in formation. In the latter case, the close proximity of several airplanes will limit the range of manoeuvres which can be performed, though watching a number of airplanes performing in synchronization is a marvellous sight.

The air race which took place in Istanbul (see Section 2) would have been a spectacular sight for the city's inhabitants. The pilots involved would consider aerobatics as a sport.

Although there are specialized aerobatic aircraft, many regular aircraft are **aerobatic capable**. While some civilian pilots may be at least partially trained on these aerobatic capable aircraft, learning some basic manoeuvres, the profile of a commercial pilot is entirely different from the world champion pilot featured in Section 2. Commercial pilots spend their careers keeping carefully within a predefined, safe **flight envelope**.

for fun



The true nature of the job ...

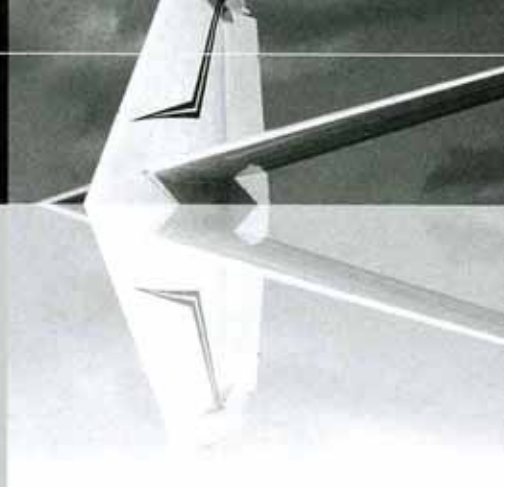
'You're a pilot, that must be really exciting,' said the little boy on seeing the airline pilot in his uniform.

'Not if I do it right,' replied the pilot.

GRAVITY

Section one – Ultralight

This section deals with an ultralight aircraft which has a particularly innovative design. It teaches the vocabulary of basic aeronautical movements and the flight controls which make these movements possible. It also presents the language function of explaining how things work.



- 1 Ask this question before students open their books and see the picture. Students may not necessarily think of ultralight aircraft. There may be gliding enthusiasts in your group, as this is a more common recreational activity. When feeding back on what they discussed with their partners, prompt them in order to introduce the subject of ultralight aircraft.
- 2 Ask students to cover the text so that they predict rather than look for the answers in the text.
- 3 Note that the *throttle* switch is twisted to make the propeller rotate faster, in other words to increase its *rpm* (revolutions per minute). This effectively powers the GEN-H4 upwards, by providing *lift*, therefore allowing it to *climb*. When the pilot wants to descend and land it's necessary to *throttle* back gradually, in other words reduce rpm, but not too suddenly, in order to land gently. The terms *pitch*, *roll* and *yaw* are explained in the introductory notes.

Note that there is some ambiguity in Question 6. The text states that you don't need a licence, but then in the final paragraph implies that it may be illegal to fly the GEN-H4 in some countries. Ask students what they think the regulation would be in their country.

- 1 b (a helicopter – a gyrocopter has a propeller at the back and a non-powered rotor above)
- 2 four (two sets of two)
- 3 by miniature 125 cc / 8 hp engines
- 4 90 kmh / 59 mph
- 5 by using a handlebar with a throttle, yaw switch and weight shifting
- 6 no (but could depend on the country)
- 7 40 hours

Functional English – Explaining how something works

- 1 After students have completed the activity, check that they have understood the use of these structures by writing on the board the following sentence and asking them to complete it in different ways:

A pilot of a fixed-wing aircraft controls pitch _____ the elevator. (by means of / by moving, by raising or by lowering, etc.)

Show the students that the sentence can be expressed without *by*, e.g. *Moving the elevator controls pitch.*

Point out that:

- *by means of* is always followed by a noun
- *(by) + verb (-ing)* refers to the action done to get a result
- *you get a result by doing an action*
- *doing an action gets a result*

- 1 by means of, pushing
- 2 Pushing
- 3 by flicking



2 This activity provides controlled practice of the language in Activity 1.

- 1 move, by means of
- 2 Moving, controls
- 3 by means of
- 4 adjust, by moving
- 5 Pushing, turns
- 6 changes, by raising, lowering

Vocabulary – Manoeuvring an aircraft

1 This is a useful activity for consolidating the vocabulary learned and will appeal to those students who learn best by doing things. You might consider having students make paper airplanes for the activity, or hand out model aircraft if you have them.

An additional activity after they have practised with their partner would be to introduce an element of competition by seeing who has the fastest (and correct) reaction times to the eight instructions (*pitch – roll – yaw – climb – lift – turn – dive – sink – tip over*). This activity will work best if the instructions are read by other students at random.

2 Explain to the students that these questions relate to the GEN-H4.

- 1 climb
- 2 by flicking the yaw switch
- 3 you descend / sink
- 4 by shifting your weight right
- 5 you tip over
- 6 by twisting the throttle
- 7 hover
- 8 by throttling back and not shifting your weight

3 This activity could be very interesting depending on the students' experience. You could prompt them to talk about gliders, hang-gliding or other similar activities.

Speaking

This activity gives students the chance to express their opinions about the GEN-H4. If you have a group of controllers, they are likely to be concerned about the safety implications and the possible threat of a collision with low-flying aircraft, so you could expect them to answer yes to Question 2. Pilots might take a similar position for the same reasons.

Fixed wing aircraft are usually airplanes (or gliders), *rotary wing* aircraft are generally helicopters. Helicopters can go straight up and down, and also hover. They don't need airports. Airplanes can travel long distances in a short time, but they have to keep moving. Note that the words *airplane* and *aircraft* are generally used interchangeably to mean a fixed wing aircraft. It is only in particular contexts, such as this discussion activity, where it is necessary to differentiate between the two terms.

When discussing the advantages and disadvantages of both, students may try to use the language of comparison and contrast, which is presented in Section 2. It is a good idea to monitor what they are saying because you will be able to see in advance how much (or how little) of this language they can produce correctly.


Section two – Air race

This section deals with detailed descriptions of various aerobatic manoeuvres, described in an interview with a world champion pilot. It teaches units of measurement and numbers and presents the language function of comparing and contrasting.


- 1 Students may not have heard of the Red Bull air race, but they ought to be interested in finding out more. Further information about this race is available on the web site: www.redbullairrace.com. You may wish to refer to this site yourself, or to suggest to students that they do so.

Racing aircraft and conventional aircraft are very different and this becomes clearer when students listen to the interview and the description of the kind of manoeuvres the racing aircraft are designed to perform.


In response to Question 3 students might mention some air shows they have been to. If this is the case, ask them to exchange information about the different air shows they have attended.

- 2  25 In this interview, the pilot reuses much of the vocabulary presented in the previous section. The initial aim for students is to identify the movements as he talks about them.

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

- 3  25 Students match the names to each of the eight manoeuvres. Tell them that two words aren't needed. If you have a group of students who seem to be struggling with the activity, you could tell them that *loop* is used twice and *roll* is used three times.

- a half roll
- b full roll
- c inside loop
- d outside loop
- e hammerhead
- f tail slide
- g Cuban eight
- h barrel roll

- 4  25 The students listen a third time to find the answers to more detailed questions. The task for this third listening introduces some numbers, in preparation for the vocabulary activities to follow.

- 1 the tail slide
- 2 speed
- 3 an Extra 300s
- 4 672 kg
- 5 25°
- 6 He almost crashed as a result of hydraulic problems.
- 7 very good, positive

25 Listening script

I = interviewer, T = Thiago

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



Vocabulary – Units of measurement

- 1 26 In the aviation world, both non-metric and metric units of measurement continue to be used. What is even more interesting, and perhaps surprising, is that knots and nautical miles are the standard measures of speed and distance respectively. These measurements were adopted from shipping in the early days of controlled flight and have remained as the standard measurements ever since. A nautical mile (nm) is a bit longer than a mile (1.15 miles) and almost two kilometres (1,852 m). A knot (kt), correspondingly, is nearly two kilometres per hour (1kt = 1nm/h = 1.15mph / 1.852km/h).

26 Listening script

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

- 2 27 If you think your students will find this activity difficult, you could get them to listen to the recording twice. The first time they listen, students should just check that they have written the units of measurement in the correct columns. For the second listening, they should write the actual figures.

specifications	Extra 300s	
	non-metric	metric
length	22.6 ft	6.9 m
height	8.5 ft	2.6 m
weight (unladen)	1,480 lb	672 kg
wing area	98 ft ²	9.1 m ²
g-rating	+/-10 gs	
engine	300 HP	
max. speed / VNE	220 kt	
stall speed / VS	60 kt	
climb rate	3,200 ft/m	975 ft/m
roll rate	400 °/s	
range	510 nm	944 km

27 Listening script

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

- 3 28 When students have completed this activity, write the numbers in full on the board and ask them to mark where the stress lies.

Explain that *and* is never stressed in numbers and is barely audible. On the other hand it is important to stress *point*, or else there might be a serious misunderstanding.

For further practice, provide students with other numbers, focussing on pronouncing them with correct stress patterns.

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

28 Listening script

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

Speaking

Here students have the opportunity for further practice of both numbers and units of measurement.

Functional English – Comparing and contrasting

- After they have completed the activity, review the following points:
 - the way in which comparatives and superlatives are formed from adjectives
 - the usage of the different structures below:
(comparative) *than*
not as (adjective) *as*
as (adjective) *as*
the (superlative)
a little / a lot (comparative) *than*
- Students work in pairs or individually to write sentences comparing the two racing planes, before checking with the class. In larger classes, get students to check their sentences in groups.
- This activity offers the students the chance to talk about different aircraft, and to compare them. In response to Question 1 they may talk about Concorde, developed by Britain and France in the late 1960s, which was a major innovation technologically, though commercially unsuccessful in the long term. The aircraft which was developed by the Americans shortly afterwards, the Boeing 747, and is still in service today, has been a great commercial success. It was, until recently, the largest passenger jet. The Airbus A380 can carry more passengers, though there is some debate as to whether or not it will be a success. Boeing have responded by developing the Boeing 787, which is a medium-sized long range aircraft that they claim offers greater efficiency. Students may wish to compare and contrast the long term strategies of Boeing and Airbus.

An interesting homework activity is to ask students to gather technical information about two commercial aircraft (e.g. the Airbus A320 and the Boeing 737). They could then conduct mini-presentations in a later lesson where they compare and contrast these aircraft.

Section three – Hydraulic loss

This section deals with an emergency situation in which a pilot loses hydraulic power. It practises the language functions of expressing difficulty (for pilots) and offering assistance (for controllers). The pronunciation activity illustrates the feature of placing extra stress on the most important word in a sentence.

- 1 The main idea is that hydraulic failure will result in greatly reduced control of the aircraft. Back-up systems are often minimal. Hydraulic failure isn't very common but it does happen. It is a serious problem that usually leads to declaring an emergency.

In answer to Question 4, hydraulic failure is likely to affect the main control surfaces, ailerons, the elevator and the rudder. In the listening which follows the pilot also signals a problem with spoilers, reverse thrust and brakes. He says that the flaps are working, though in another incident this might not be the case. He also says the landing gear is extending correctly. Although normal functioning depends on the hydraulics, there is usually a back-up system available.

- 2 29 See the introductory notes to this unit for an explanation of *elevator* and *ailerons*.

The pilot mentions elevator and ailerons.

29 Listening script

P = pilot, C = controller

- P Approach. Executive 56. We're having trouble controlling the attitude. It's difficult to establish level flight. Declaring an emergency. Executive 56.
- C Executive 56, roger your emergency. State intentions.
- P We'd ... er ... like to come back to your airport but we are still trying to fight the pitch and bank. We've got low hydraulic pressure and we've got very little deflection on the elevator or ailerons. Executive 56.
- C Executive 56. Just tell me what you need and I'll get it for you.
- P It's very difficult to pull or turn on the column ... er ... we're using asymmetrical thrust ... er ... we're using the engines to turn. We can only make big turns. Executive 56.
- C Executive 56. Roger. Big turns only. Manoeuvre at your discretion.
- P We're going to go out west and then make a straight in approach if that's possible. We're fighting to keep it straight and level. We will need very long final. I don't think we have spoilers, reverse thrust or brakes, so we'd like the longest runway possible. Executive 56.

- 3 If you think your students will find this activity difficult, you could play the recording again. Students may need to listen several times in order to complete this activity.

The *attitude* of the aircraft refers to whether the nose is pointing upwards (nose up) or downwards (nose down). In this particular incident the pilot has lost the use of the elevator, ailerons and rudder (which control pitch, roll and yaw respectively), thus making it difficult to control the aircraft.

With the usual control surfaces (moveable parts of the aircraft) not working, the pilot has to use *asymmetrical thrust* to turn the aircraft. This means that a different level of thrust is applied to each engine. While this will succeed in turning the aircraft, it is a less precise way of doing so.

A *short* and a *long final* both refer to the final approach to an airport before landing. A long final means that the aircraft will line up with the runway earlier and descend more gradually, covering a greater distance than when on a short final. For the pilot who is having difficulty with the flight controls, this is the safest way to land as there will be more time available to correct any error. Likewise a *visual landing* is safer and easier to perform than a precision approach on ILS. See the introductory notes to Unit 9 (Landings) for a full explanation of these terms.

- 1 low
- 2 bank
- 3 big
- 4 asymmetrical thrust
- 5 west
- 6 long

- 4 30 Ask students to discuss their ideas about what will happen in pairs or small groups before they listen.

The crew will ...
adopt landing configuration to control speed and height
make a visual approach (not listed)

The controller will ...
give the crew vectors to the runway
offer to activate emergency services (not listed)

30 Listening script

- C Executive 56. OK, a visual on runway 07. Would you like emergency assistance at the far end of the runway?
- P Affirm, Executive 56.
- C Executive 56. The services have been activated. Do you want me to line you up with the end of the runway right now?
- P Yes please, but we are really struggling to follow a heading. Please keep giving us vectors to the field. Executive 56.
- C Executive 56. Roger. Turn left heading 050°.
- P 050. We're adopting landing configuration now to slow us down. Executive 56.
- C Roger. Executive 56. ②
- P We have flaps and ... er ... and landing gear is down and control is easier now. We have the field in sight.
- C Executive 56. Roger. You are cleared to land runway 07. Wind 170 with 26 kt.



- 5 31 Ask students to discuss how the incident might end. After discussion, have the class take a vote on the most plausible scenario before they listen.

This final outcome had the potential to be very serious. Overrunning a runway can have fatal consequences, depending on what is at the end of the runway. In this case the aircraft is probably stuck on grass, which explains why a tow truck will be needed.

It landed safely, but overshot the runway and needed a tow truck to get back.

31 Listening script

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

Functional English – Expressing difficulty and offering help

- 32 The meanings of the expressions presented are very clear from the context.

You could suggest to students that they memorize the key expressions presented here, selecting the four they would use, depending on whether they are pilots or controllers. They will be invaluable in an emergency situation.

In Sentence 2, *establish level flight* means to stabilize the aircraft. In Sentence 6, *line you up with the end of the runway* means to direct you so that you will be travelling in a straight line towards the runway. In Sentence 7, *follow a heading* means to go in the precise direction required.

- 1 having trouble
- 2 difficult to
- 3 what you need, I'll get it
- 4 fighting to
- 5 Would you like
- 6 Do you want me to
- 7 struggling to
- 8 there anything else

32 Listening script

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

Pronunciation – Tonic stress

- 1 32 Tonic stress is a feature of speech that is useful for students to reproduce when they want to draw the listener's attention towards a particular word.

2 32

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

Speaking – Helping a pilot in difficulty

- 1 / 2 If you think students will struggle with this activity, divide the class into Groups A and B. Have Groups A be the pilots and Groups B the controllers. Give them five minutes to think of answers, then form AB pairs to role-play the situations.



Section four – Language development

Functional English – Explaining how something works

- 1 1 by means of
- 2 with the use of
- 3 by way of
- 4 by
- 5 by
- 6 With the help of
- 7 through
- 8 with the help of
- 9 using
- 10 by means of

Comparing and contrasting

- 2 1 worse 6 shorter
- 2 quicker 7 windier
- 3 faster 8 more serious
- 4 better 9 taller
- 5 busier 10 more urgent
- 3 1 much heavier 5 most important
- 2 powerful as 6 as many
- 3 longer than 7 farther than
- 4 as good 8 fewer
- 4 1 busier 4 safer
- 2 bigger 5 more fuel-efficient
- 3 more expensive 6 longer

Expressing difficulty and offering assistance

- 5 1 I'm having trouble understanding what the pilot is saying.
- 2 It's difficult to hear you because of the background noise.
- 3 We're fighting to control the plane.
- 4 They're struggling to keep up with the increase in air traffic.
- 5 Would you like emergency assistance?
- 6 Is there anything else you need?
- 7 Tell me what you need and I'll get it for you.

Vocabulary – Manoeuvring an aircraft

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

Vocabulary from the unit

- 2 1 fixed-wing
- 2 rotary-wing
- 3 hang-glider
- 4 glider
- 5 tow truck
- 6 leaking



PHOTOCOPIABLE ACTIVITY

This is a well-known story so it might be possible to elicit some of the facts from the students before they read it. They can then read to confirm what they already know or think they know. If they don't know the story, you might ask them to speculate on the record. You could ask students to discuss one or more of the following questions in pairs or groups:

Who was Steve Fossett and what record(s) did he hold?

Which new record did he set in 2006?

How did he do it? Do you know anything about his aircraft? Who helped him?

OR

What did you think is the record for the longest distance covered by a plane without refuelling?

Do you think this could be done flying solo or would it need more than one pilot?

What kind of preparation would be needed to attempt such a record?

The gap fill activity is a comprehension check and a review of aviation vocabulary.

The discussion activity then allows students to express their opinions.

Key

- | | | | | | |
|--------------|--------------|------------|-------------|--------------|-------------|
| 1 refuelling | 3 cockpit | 5 tanks | 7 emergency | 9 windshield | 11 solo |
| 2 landing | 4 efficiency | 6 wingspan | 8 tyres | 10 pilots | 12 aviation |



1 Read and complete the news story with the words from the box.

aviation cockpit efficiency emergency landing pilots
refuelling solo tanks tyres windshield wingspan

February 18, 2006

Fossett sets new long-distance flight record

The 61-year-old American millionaire Steve Fossett has set a new world record for a long-distance flight without (1) _____ after flying more than 26,000 miles. He set off from Florida last Wednesday, and circled the globe flying eastwards, before crossing the Atlantic a second time and (2) _____ on Saturday in Bournemouth, Great Britain. The flight took a total of about 80 hours and perhaps the most astonishing thing was that Fossett was alone in the (3) _____ all that time.

Fossett's plane, designed with maximum fuel (4) _____ in mind, took off with 18,000 pounds of fuel (six times the weight of the aircraft itself) in two huge (5) _____ suspended on each wing. It had a (6) _____ of 35 metres, three times its length. While the flight went well, it was not without problems, particularly at the end. He had originally intended to land in Kent but had to declare an

(7) _____ and divert at the last minute due to an electrical failure. He landed on battery power alone and burst two (8) _____ while landing. His (9) _____ was heavily-iced, seriously impairing visibility, and he had only 200 pounds of fuel left when he touched down. His friend and sponsor Richard Branson flew behind him during the final leg. He actually broke the record as he was crossing Ireland, just before his problems began.

The previous record stood at 24,987 miles and had been set by two (10) _____, Dick Rutan and Jeana Yeager back in 1986. This was also the first time anyone had flown around the world without refuelling. While it was to be expected that this record would be broken one day, nobody thought that it could be done by a pilot flying (11) _____. Fossett, with his taste for adventure, has once again taken the (12) _____ world by surprise.

2 Look at the following statements and decide if you agree or disagree. Work in pairs. Discuss your opinions.

- 1 Steve Fossett deserves our admiration for a fantastic achievement.
- 2 Too much money is spent on trying to set records like this.
- 3 The risks in a flight like this are too high for the pilot.
- 4 The pilot proved he has real courage to attempt this record.

Introduction

Medical emergencies on board are one of the main reasons why an aircraft may need to divert if the emergency is serious enough and cannot be treated within the airplane itself. A general overview of the kind of medical emergencies that may occur is provided in the article in Section 1 and it is worth taking a few minutes to read it now.

The final decision as to whether a diversion is necessary or not rests with the captain on board. All aircraft have a medical bag on board and cabin crew receive first aid training. A request may be made for any doctor who happens to be travelling on a flight to make themselves known to the crew, with a view to a possible intervention. A recent innovation is the **MedLink** service where a specialist opinion may be provided at a distance. This is the case in the incident featured in Section 3.

Contributing causes to medical emergencies on board

Some passengers board an aircraft with an underlying medical condition which makes flying inadvisable. Airlines will try to screen such passengers and they have the right to stop them at the departure gate and refuse permission to embark. But unless the symptoms are very obvious, passengers at risk will remain undetected until it is too late. Sometimes the passengers themselves may not be aware of their own condition until a problem occurs. With the increase in leisure travel and particularly long haul travel by elderly passengers, the likelihood of a medical emergency during flight is on the increase. No airline would want to be seen to discriminate against the older generation so there is not much an airline can do about this other than following correct procedure when a problem occurs.

A further problem in international travel is that cabin crew may be unable to correctly assess the seriousness of a medical condition due to a language barrier. It may be that someone is unable to explain the seriousness (or otherwise) of a medical condition. In such circumstances the captain may choose to divert rather than to risk a more serious outcome.

When flying itself adversely affects health

Passengers may feel perfectly healthy when boarding an aircraft, but there are increasing concerns that flying itself can be bad for your health. Indeed the problems may start before you even get on board and increasingly, busy international

airports have been identified as places where stress levels can greatly increase. We only have to think of the long queues to check in and pass through security, and long delays in boarding and taking off, to understand how this might lead to problems.

But even assuming passengers survive the airport experience unharmed (and most obviously do), there has been a lot of media attention in recent years on the condition known as **DVT (deep vein thrombosis)**. This is thought to affect frequent flyers in particular, especially those who often fly long haul. Some research has shown that long periods spent sitting in aircraft seats, with economy class being the worst of all, significantly increases the risks of developing a serious blood clot. The problem with DVT is that there are no clear symptoms and you probably won't know you're suffering from it until you actually have a blood clot, which could be life-threatening. Some research has suggested it's a risk for pilots too, but not usually for the cabin crew who spend a lot of time walking on board. Some sufferers have taken legal action against the airlines. They lost a case in the British courts in 2002 and they also lost two subsequent appeals against this decision. However, airlines became concerned about the problem and many have an advice leaflet in seat pockets warning passengers of the risks of DVT and suggesting that they take regular walks around the cabin. Most airlines now also serve less alcohol on board as drinking can increase the chances of DVT.

Turbulence can be sudden and severe and has, on occasion, lead to serious injuries or even death on board when passengers have been thrown out of their seats. Travellers are now advised to keep their seatbelts fastened throughout the flight.

High stress levels, excessive alcohol consumption or psychological problems have all been found to be possible factors in incidents of **air rage**, when a passenger becomes aggressive and may present a danger to the safety of others or to the flight itself. This is discussed further in the introduction to Unit 12.

Precautions on board

As already mentioned, cabin crew undergo first aid training for medical emergencies and the services of any doctor on board may be solicited too. The items contained in the medical bag on board are increasingly sophisticated. Airlines are also making use of the new MedLink service. When in doubt during a medical emergency, an airline pilot will divert rather than take any unnecessary risks.



The role of air traffic controllers

Air traffic controllers are also trained to deal with medical emergencies. While the decision to divert will always rest with the pilot, air traffic controllers provide an essential link with medical services on the ground. Once a decision to divert has been taken, the controller is responsible for making sure that the appropriate medical services are properly informed and standing by, ready for action when the airplane lands.

Human factors in aviation

Section 2 deals with the general problem of stress in the workplace. Both pilots and controllers are prone to stress. An ability to recognize stress, and deal with it effectively, is an important part of the training that they receive in human factors. Pilots and air traffic controllers are taught that mistakes are often made when under pressure, when fatigued or when complacency sets in.

The worst civil aviation accident in history (in terms of the death toll incurred) took place in 1977 at Tenerife airport (see the introductory notes to Unit 2). While there were many factors which played a part in this accident, one of the most important ones was the decision of the KLM captain

to take off before he had been cleared to do so. He was a highly experienced pilot and his actions that day seemed, on initial examination, incomprehensible. Experts suggested that he was fatigued, under stress and simply impatient to get airborne. In the years following the accident, greater emphasis during training was given to addressing the psychological factors that lie behind human error.

Training in human factors is now highly developed. It is worth repeating once more that flying is by far the safest way to travel. Yet accidents do occur and even though they are extremely rare, the statistics are no comfort to the families of the victims, nor do they always reassure the travelling public. Aircraft reliability and available technology have reached such levels that it is almost always human error that is found to be the main contributing factor to an accident. Further improvements in safety are thus conditional upon eliminating, as far as possible, such mistakes. Yet experts in the field of human factors will stress that you cannot eliminate human error entirely and it is important for both pilots and controllers to recognize this and understand their own weaknesses. The focus these days is upon building checks into any operating system, technology providing a very useful check in many cases with increasingly sophisticated warning systems. Sufficient checks in the system should mean that the eventual consequences of inevitable human error become less serious.

for fun

A reckless pilot ...

Tower: Is this the same aircraft declaring emergency about two hours ago?

Pilot: Negative, sir. It's only the same pilot.

HEALTH

Section one - Is there a doctor on board?

Although there frequently is a doctor on board a flight, airlines cannot depend upon this and so all cabin crew are trained in first aid procedures. This section deals with some of the most typical medical emergencies that can occur on board an aircraft. It presents the vocabulary needed to talk about medical emergencies. This is supported by teaching the language function of expressing cause and effect.

- 1** Before students open their books, ask them to discuss in pairs some examples of common medical emergencies that can occur on board an aircraft. While monitoring this activity, supply them with any vocabulary they may require. Discuss students' answers with the class and write some of the emergencies mentioned on the board. Then ask the class which elements of an aircraft first-aid kit might be used to deal with these emergencies. Teach the vocabulary that they need then ask them to open their books and complete the activity.

bandage	A
defibrillator	F
EpiPen	B
inhaler	C
plaster	G
insulin pen	E
splint	D

- 2** 1 B 2 E 3 G 4 D 5 C 6 A 7 F

- 3** This comprehension activity checks that students understand the main ideas of each section of the article.

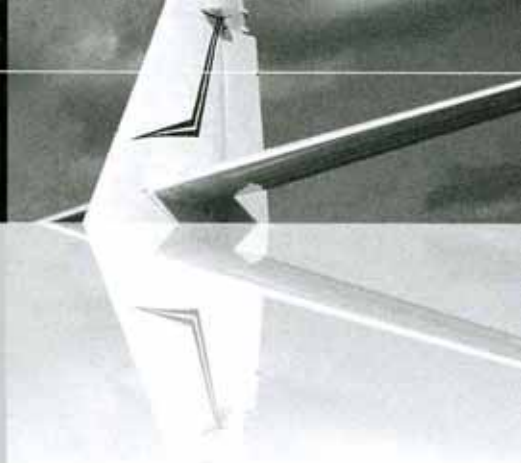
A	7
B	3, 4, 6
C	5
D	1
E	2

- 4** This activity checks students' comprehension of details in the article.

- 1 heart attack
- 2 falling items and turbulence
- 3 People sometimes leave their medicine in the hold.
- 4 Some airlines have stopped serving peanuts.
- 5 It is more difficult to eat regularly.

- 5** It is possible that neither pilots nor controllers have had training in first aid procedures, as it is cabin crew who are responsible for assisting passengers with a medical problem. The pilot's place is in the cockpit and controllers are clearly unable to help directly. Nevertheless, both pilots and controllers will have been trained to recognize situations which require an aircraft to divert. They should also have enough knowledge to know which medical services to request or provide on the ground.

Students may have some interesting experiences to share with the class in answer to Question 2. If they have not actually witnessed any emergencies, you could ask them to mention any emergencies they heard about during their training or from any other source.





Functional English – Expressing cause and effect

This language function is particularly important when talking about symptoms and possible consequences of medical emergencies on board.

When students have completed the activity, write the following two sentences on the board: *There was heavy fog. / There were delays.* Ask the students which is the cause (*fog*) and which is the effect (*delays*). Then ask them to connect these sentences using four of the structures in the book as a further practice activity. (*The delays were caused by heavy fog. / The heavy fog resulted in delays. / The delays resulted from heavy fog. / The heavy fog led to delays.*). Elicit the fact that each structure works in one direction only, cause-effect or effect-cause. To reinforce this point further, ask the students how the following common link words work:

because (effect-cause)
so (cause-effect)
due to (effect-cause)
therefore (cause-effect)

- 1 leading cause
- 2 caused by
- 3 result in
- 4 result from
- 5 lead to

Vocabulary – Medical emergencies

- 1 airways
- 2 episode
- 3 first-aid kit
- 4 limbs
- 5 cardiac monitor
- 6 anaphylactic shock
- 7 cardiac arrest
- 8 injection

Speaking – Saving the life of your airline

- 1 This activity provides an opportunity for students to discuss measures which can be taken to reduce diversions due to medical emergencies to a minimum. It is not an easy question, but you can encourage them to be creative in their proposed solutions. Ideally they should aim to come up with five measures, but you could accept fewer, particularly if they have some innovative solutions.
- 2 If you have a large class, ask the students to form two groups, each of which votes on their favourite suggestions. You can then set up a debate between the two groups on the final solutions to be adopted.



Section two - Stressed?


This section deals with the problem of stress at work, which is of importance to both pilots and controllers as it can affect their performance and lead to crucial mistakes. The listening activity discusses the problem in general and suggests various solutions. The section teaches the language function of making suggestions and giving advice. Finally, the pronunciation section practises the pronunciation of difficult consonant clusters.

- 1 Tell students to keep their books closed. Write the word *stress* on the board. Ask the students what they think it means.

Encourage them to give some examples of stress. As they speak, add some of the adjectives from Activity 1 onto the board, as and when they correspond to the feelings students describe.

When all, or nearly all, of the adjectives are on the board they can open their books and do Activity 1.

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

- 2 Encourage students to give advice and make suggestions to their partners. Walk around and monitor the language they use. This will allow you to see how much of the language function to be taught in Functional English they already know.
- 3 Students may mention things such as divorce, financial pressures, worries about family or children, job insecurity, medical problems or any other issues which cause stress in the modern world.
- 4  33 The causes mentioned are lack of sleep, breakdown of a relationship, money problems, too much work.

33 Listening script

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

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



- 5 33 Before listening, ask students to try to remember the advice given in the talk. Make notes on the board, then listen again.

Identify cause of stress (e.g. keep a diary)
Take regular holidays
Take breaks at work regularly
Talk to a friend
Get counselling
Sleep, eat and exercise well
See a doctor if you can't sleep well
Spend time doing things you enjoy
Try meditation and massage

- 6 This activity gives the students the opportunity to relate the information given in the workshop with their own professional experiences in the world of aviation. What they say may differ greatly, depending on the exact nature of their job and the conditions they work under. Try to create a genuinely supportive environment if you can. It is possible that students may feel free to mention issues in their English classes that they would be embarrassed to talk about at work. If there is a good relationship between the students in your group, they may be quite understanding towards each other, listening to each other's problems and providing constructive suggestions. They may already have started this process in Activity 2 above. On the other hand, students may be embarrassed to talk in front of their peers (or superiors) about such sensitive issues. If you feel this is likely to be the case, keep the discussion impersonal.

Functional English – Making suggestions and giving advice

- 1 / 2 33 When students have completed these two activities, present the following summary of most of the structures used in this section for giving advice. Note that they range from simple to more complex structures. Students do not need to remember all of them, though encourage them to try and use as many as possible in the speaking activity at the end of this section.

- Verb (imperative)
- Try and + infinitive
- You should / shouldn't + infinitive
- I suggest + verb(-ing)
- I suggest you + infinitive
- You may want to + infinitive
- It can help to + infinitive
- I would advise you to + infinitive

- | | | |
|---|---------------|---------------------|
| 1 | 1 Try and | 6 best way of |
| | 2 suggest | 7 I suggest you |
| | 3 should | 8 Another good idea |
| | 4 it can help | 9 would advise |
| | 5 may want to | |
-
- | | | |
|---|-------------|-----------|
| 2 | 1 shouldn't | 5 suggest |
| | 2 suggest | 6 Try and |
| | 3 can help | 7 advise |
| | 4 may want | |

Pronunciation – Consonant clusters 1

- 1 34

34 Listening script

stress
pressure
spending
flaps
flight
breakdown
specific
plans

- 2 35 For students who find this activity reasonably straightforward, you might like to introduce one of the following activities:

- 1 Ask each student to give you one word that they use in their professional lives but have difficulty pronouncing. Put these words on the board and discuss with the group the reasons they may be difficult to pronounce. Then practise all the words together.
- 2 Choose some aeronautical words with consonant clusters that you have regularly heard mispronounced in your classes and follow the same procedure.
 - 1 We're still struggling to get a slot.
 - 2 The brake light is blinking.
 - 3 Is the runway dry enough to drive on?
 - 4 The flaps are frozen and need freeing.
 - 5 I'll wipe the grease off the glass.
 - 6 I've tried to fix the trouble twice.
 - 7 There's a threat of strikes throughout the country.

35 Listening script

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

Speaking – Giving advice

- 1 / 2 Students have the opportunity to act as experts when talking to new recruits in their profession about what can cause stress and how this stress can be minimized. If your students are undergoing initial training as pilots or controllers, you can ask them to report on training they have undergone in this area, or what advice they have received. Encourage students to ask each other as many questions as possible.



Section three - Medical emergency

This section deals with a medical emergency on board in which the flight crew do not initially understand the nature of the problem and need to contact a medical advisory service. It teaches the use of the present perfect tense for giving updates in a rapidly changing situation and the language function of giving and asking for updates. It also teaches the pattern of rising and falling intonation in lists.

- 1 36 This first comprehension activity checks that the students have understood the main events in the dialogue.

- 1 MedLink (medical advisors)
- 2 They have a sick passenger on board.
- 3 Scuba diving

- 2 36 The students listen once more to the dialogue and try to understand various details of the particular situation.

Note the answer to Question 8. The pilots are advised to perform an emergency descent once the medical advisors realize that this is a case of decompression sickness. The passenger's condition has deteriorated under the effect of flying at altitude. This diagnosis clearly illustrates the value of a medical advisory service. It is very unlikely that anyone on board would have realized the exact nature of this problem.

The final advice given by MedLink is also interesting. Not only should the aircraft divert as soon as possible, the pilots need to find an *alternate* (an airport they can divert to) where the passenger will be able to be transferred quickly to a decompression chamber. In any serious medical emergency, the facilities available on the ground to treat the passenger are of crucial importance.

- 1 Belgian
- 2 departing from
- 3 29
- 4 back
- 5 holiday, ten
- 6 France
- 7 15
- 8 descend immediately

- 3 36 Before the students listen for a third time, ask them which symptoms they can remember mentioned in the dialogue. Explain the meaning of any of the eight symptoms given in the activity which they do not understand. Students often have difficulty with the correct pronunciation of the word *blood*, so help them to say it correctly if necessary.

trouble breathing, shaking, in great pain, coughing blood, losing consciousness

36 Listening script

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

- CPT** Cairo Centre, this is Divestream 290.
C Divestream 290 Cairo Centre. Pass your message.
CPT We have a medical situation on board. We are contacting MedLink now. Divestream 290.
C Roger, you have a medical problem on board. Keep us advised. Cairo Centre. (ii)
M MedLink. I'm Dr Slowinski. Which flight are you calling from, please?
F This is Divestream flight 290 and this is Moustaf, the first officer.
M Thanks Moustaf. How can I help you?
F We have a passenger, a young man from Belgium. He's having difficulty breathing, he's shaking badly and his eyes are shut.
M How old is the man?
F He's in his late twenties.
M Is he able to communicate?
F No. I don't think he can hear anyone. He's crying in pain.
M OK, you should move the other passengers away from the patient, if possible.
F Luckily his seat is to the rear of the aircraft, so we've already moved the other passengers away.
M Good. Have you removed his seatbelt?
F Yes, we have. We've laid him down on the floor.
M That's good. Where has he been?
F From his passport, it looks like he has been on holiday in Egypt for ten days.
M Have you found any other information about him?
F No, we haven't found anything else yet. We're looking through his belongings.
M Has he eaten or drunk anything?
F No, the crew haven't begun to serve drinks yet.
M I see you are travelling to Paris CDG. How long have you been airborne?
F We've been in the air for about fifteen minutes.
M So you're still climbing. Are you climbing rapidly?
F Yes, we are. ATC asked for a steep climb out of Cairo due to traffic.
FA Moustaf, he has just started coughing blood, and we think he is losing consciousness.
F Oh dear ...
FA I've just looked in his hand luggage. I found a hotel receipt, a wallet and a scuba-diving log book. It looks like he dived this morning.
M Did I just hear that the patient dived this morning?
F Er ... yes.
M OK, this sounds like it is a case of decompression sickness, which is a critical condition. You should stop climbing and descend right away if you can - every foot you climb could seriously affect the patient's health. You should divert and find an alternate airport that has medical services. Try asking ATC to help you find an alternate that is close to a decompression chamber. There should be a diving decompression chamber somewhere on the Red Sea.
F Roger, levelling off and initiating descent ...



Functional English – Giving and asking for updates

- 1 37 These extracts from the dialogue illustrate the use of the present perfect tense to check what has and has not happened in a situation which is evolving fast.

Check that the students understand the use and the meaning of *already* and *yet*. These words carry a lot of meaning in emergency situations. Present the word *still* as well, which is often used informally as an alternative to *yet*, though the word order is slightly different:

The bleeding hasn't stopped yet. = *The bleeding still hasn't stopped.*

- | | |
|----------------|------------|
| 1 've already | 4 Has he |
| 2 Have you | 5 've just |
| 3 haven't, yet | |

37 Listening script

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

- 2 If necessary, review the meaning of the present perfect simple, and elicit examples of sentences using present perfect simple.

- Present perfect simple
- have / has + past participle*

- 3 This activity practises the language just presented in the context of another medical emergency.

- | | |
|----------------------|------------------------|
| 1 has fallen | 5 've already done |
| 2 's cut | 6 haven't taken it yet |
| 3 's lost | 7 just regained |
| 4 hasn't stopped yet | |

Pronunciation – Intonation of lists

- 1 38 Copy the sentence *He's having difficulty breathing, he's shaking badly, and his eyes are shut.* on the board. Ask students to close their books and play the recording. Ask them to identify how the voice rises or falls and draw the arrows above the sentence. Get students to open their books and check. Elicit that intonation rises with each item in a list until the final item is given. At this point, intonation falls. This pattern allows the listener to know when a speaker has completed a list.

38 Listening script

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

- 2 Ask students to mark the intonation on the sentences.

- 3 39 Once students have completed the activity, you could ask them to write a list of symptoms a passenger is suffering from. In groups, they then practise saying the list, using the correct intonation.

- rising: Nausea, dizziness, consciousness

falling: sweating
- rising: trembling, coughing

falling: crying
- rising: lie, put

falling: call

39 Listening script

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

Speaking

- 1 To complete this table, students use the language they learned in the unit as well as what they learned previously in their training. When feeding back, encourage all students to share information so that everyone is then prepared for the role-play in Activity 2.

(Suggested answers)

condition	symptoms	actions
heart attack	chest pains, difficulty breathing, sudden collapse	administer vasodilator spray, use cardiac monitor and contact medical advisor, give CPR
hypoglycaemic episode	sweating, dizziness, disorientation	give glucose injections
fractured arm	jolted during turbulence, loss of movement in arm, severe pain	use splints and bandages to stabilize arm, administer painkillers
severe allergic reaction	breathing problems, turning red, scratching	inject adrenaline, inject antihistamine, use EpiPen (if available)

- 2 Give students time to prepare and practise their dialogues. Invite pairs to role-play their dialogues for the class.



Section four – Language development

Functional English – Expressing cause and effect

- 1 1 by
- 2 of
- 3 in
- 4 of
- 5 to
- 6 by
- 7 in
- 8 of
- 9 from

Making suggestions and giving advice

- 2 1 to calm down
- 2 take
- 3 to go
- 4 following
- 5 to walk
- 6 taking
- 7 to go
- 8 stabilizing
- 9 to move
- 10 giving

Giving and asking for updates

- 3 1 Has he stopped vomiting yet?
- 2 Have you any idea when the symptoms began?
- 3 His blood pressure has fallen and he looks very pale.
- 4 I've already spoken to MedLink.
- 5 I've just put the passenger into the recovery position.
- 6 The bleeding hasn't stopped yet.
- 7 The passenger has cut his head and needs treating immediately.
- 8 The passenger has just regained consciousness.

Vocabulary – Medical emergencies

- 1 1 g
- 2 c
- 3 e
- 4 f
- 5 a
- 6 b
- 7 d
- 2 2 go, labour
- 3 inject, insulin
- 4 give CPR
- 5 restart, heart
- 6 open up, airways
- 7 struggling, breathe
- 3 1 bandage
- 2 CPR
- 3 splint
- 4 plaster
- 5 inhaler
- 6 Aspirin
- 7 Adrenaline, antihistamine, EpiPen
- 8 defibrillator



PHOTOCOPIABLE ACTIVITY

This discussion activity looks at how best to deal with different situations in which a close colleague exhibits signs of being under serious stress. Hand out a situation card to each student. Ask them to read it and then discuss with a partner what would be the best course of action to take. Students should consider the following two questions:

What would you say to your colleague?

What would you do if your colleague refused to listen to your advice?

Then ask students to change partners and give them another of the situation cards, repeating the procedure. Having the students rotate is a good way to keep the activity interesting, as students will have different ways of approaching these problems. If necessary, review the functional language for making suggestions and giving advice in Section 2 before students start the activity.

**A**

Last week your colleague, Jeremy, made a major mistake, which fortunately did not have any serious consequences. In fact, nobody else even knows about this mistake except you. Jeremy is normally very good at his job and the mistake was out of character. He has decided not to tell anyone else about what happened and has asked you to keep it a secret.

B

Yesterday your colleague, Andrew, reported for work after having been drinking in a bar. You noticed, but nobody else did. While he seemed to be carrying out his duties as normal, you are very concerned about this situation. You believe that he drinks too much and has a problem, though this is the first time that he has reported for work after drinking.

C

You know that your colleague, Maria, has always enjoyed gambling though you never thought that it was a serious problem. However, she has just told you that she lost so much money in a casino last week that she will have to sell her house. She is the kind of person who keeps her problems to herself and she doesn't want anyone else to know about this problem. You know she is under pressure and you believe it could affect her performance at work.

D

Your colleague, Sarah, is very good at her job, but has recently confessed to you that she is terrified of making a serious mistake. This irrational fear seems to be badly affecting her and so last month you suggested that she see a counsellor. She refused to consider the idea. She looks increasingly worried and upset at work.

E

You and your colleagues have been under increasing pressure at work lately. Despite having to work harder, everyone seems to be coping with the situation. Everyone except for your oldest and closest colleague, John. He has started to get angry and behave aggressively towards your other colleagues. He still seems to be doing his job properly, but you are not sure what might happen next.

Introduction

Fire on board an aircraft is an extremely dangerous hazard. With powerful engines and the carrying of large quantities of fuel on board, a certain risk clearly exists. This was especially true in the early days of aviation. Since then, aircraft manufacturers have made great progress in minimizing the risks of fire. The materials for cabin fittings are carefully chosen, smoke detectors give an early warning to the flight crew and fire extinguishers are readily available on board to deal immediately with any minor incidents in the cabin. Moreover, there are strict rules as to what goods passengers may carry on board or place in the cargo hold. Fire outside the cabin (in the cargo hold or in one of the engines) can usually be put out quickly by use of strategically-placed fire bottles, controlled from the cockpit, provided of course that the fire can be detected soon enough.

Dangerous goods

All airlines must comply with the ICAO regulations regarding the transportation of **dangerous goods**. These are usually materials which may be safely stored in your house or garage. On board an aircraft, however, they may present an unacceptable risk. This is because they will be subjected to extremes in atmospheric pressure and temperature at a typical cruising level, as well as excessive vibration at times.

The article in Section 1 of the unit gives some clear examples as to what are considered dangerous goods on board and what can go wrong. The incidents mentioned have actually happened.

The policy of airlines is to take no risks and to ban any goods which might cause a problem, even if the possibility is remote. They have strict **screening** procedures to ensure that the regulations are obeyed. Indeed the greatly increased **security** measures in place since September 11, 2001 have made things safer in this respect.

The worst case scenario

In May 1996, a DC-9 aircraft took off from Miami bound for Atlanta. Just six minutes after take-off, passengers informed flight attendants that they could smell smoke. At the same time the pilots began to experience electrical problems and requested an emergency landing at the nearest airport. Almost immediately the cabin began to fill up with smoke. The cabin crew were unable to inform the pilots in the cockpit of the problem, without opening the cockpit door (the intercom was no longer functioning). This they did and

the pilots themselves were soon affected by the toxic fumes. Unfortunately they lost control of the airplane which crash-landed, with no survivors.

Subsequent investigation showed that one of the airline's subcontractors had illegally loaded expired but full oxygen generator canisters in the cargo hold without safety caps. One of these had ignited causing a fire which quickly spread to the cabin. There was no fire detection system in the cargo hold and in any case no way to extinguish the fire. After this accident the **FAA (Federal Aviation Agency)** made the presence of detection equipment and fire bottles mandatory in all aircraft cargo holds.

Engine fire

A fire in one of the engines is always a possibility, though modern engine reliability is continually improving. The pilot usually receives an immediate warning in the cockpit and the safest procedure is to **shut down** the affected engine by cutting off the fuel supply to it. The pilot can then extinguish what remains of the fire by discharging the fire bottles. The next stage (not required for a jet engine) is to **feather** the propeller of the affected engine, in other words to turn the propeller blades to an angle causing the least air resistance (**minimum drag**). Afterwards the aircraft can either continue to its destination or the pilots can look for a suitable diversionary airport if they judge the distance to destination to be too great to continue safely.

In the introductory notes to Unit 3, an incident was mentioned in which a captain chose not to divert but to fly across the Atlantic Ocean on three of the aircraft's four engines. In fact one of his engines had caught fire and he had shut it down before contacting his airline management to ask for further guidance. The position the airline took was that the flight could continue safely. US air traffic controllers, who had witnessed the fire as the aircraft departed, apparently expressed great surprise at this decision. Yet when the incident was investigated the captain was not found to have been at fault in his decision to fly on.

Evacuation procedures

When an aircraft carries out an **emergency landing**, fire-fighting services should be on standby to deal with any fire which might break out. One major risk is that of the aircraft being unable to stop before the end of the runway. This is known as a **runway overrun** and the airplane may catch fire if it crashes into something. In such cases passengers will need to be evacuated without delay. Cabin crew are trained



for this scenario and the rules governing the availability of **emergency exits** and **escape chutes** on all aircraft are strict. If the cabin is filled with smoke, the strip lighting on the floor will guide passengers to one of these exits.

In August 2005, an Airbus A340 skidded off the end of the runway at Toronto airport in severe weather conditions and plunged into a ravine (see the introductory notes to Unit 8 for further details). Fire broke out immediately, but all 309 passengers and crew were able to escape unharmed. The cabin crew were highly praised for being able to evacuate the airplane as fast as they did.

Regulations state that an emergency evacuation of an aircraft should be possible within 90 seconds. Training exercises are conducted regularly. New aircraft need to be certified for their capability in meeting this standard (that is emergency exits need to be well-placed and should be sufficient in number). There was some doubt about how the new Airbus A380 might meet this standard with its record-breaking passenger capacity. In a simulated exercise in Germany, in 2006, 873 volunteers were all able to escape down the emergency slides in just 80 seconds. There were strict rules for this simulation. The cabin was darkened and half of the emergency exits (chosen at random) were blocked and so out of service. The volunteer passengers were chosen to be representative of the average passenger load – 35% were over the age of 50 and 45% were women. The exercise was recorded on infra-red cameras to be subsequently

validated by a panel of experts. The risk of injury even during a training exercise such as this is considerable. One volunteer sustained a broken leg, but organizers had feared that there would be more injuries.

Air traffic control and fire-fighting services

When a fire breaks out on board an aircraft, it is the pilot's responsibility to deal with the situation. The pilot may declare an emergency and may need to land as soon as possible. In this case the air traffic controller will need to make sure that the fire service are standing by on the ground and that they have as much information as possible about the problem. The importance of the fire service being able to act as soon as the aircraft lands cannot be overstated.

Even when there is no actual fire on board, a controller may need to alert the fire service if a pilot is making an emergency landing, as in many emergency situations there is a real risk of fire breaking out.

Section 2 features an aerial fire-fighting service in Russia. Many other countries have such a service to deal with wildfires. It is worth mentioning that it is an extremely risky occupation for all members of the team, many of whom have lost their lives while on duty.

for fun



One way to reduce the risk of fire ...

In Los Angeles, a single-engine airplane went down short of Burbank airport. Both people on board survived. The pilot was lucid as he was being cut out of the wreckage and told rescuers he was trying to make Burbank airport but had run out of fuel. Commenting on the lack of fire, the fire chief in charge of the rescue said,

'They're just lucky there was no fuel on board.'

FIRE

Section one – Fire risk

This section deals with the serious risk of fire that can be caused by the carrying of dangerous goods on board. A reading passage based on a report by the Australian Civil Aviation Authority describes some incidents in which there was a clear threat to safety. It teaches the vocabulary related to fire and dangerous goods, and presents the related language functions of obligation, prohibition and permission.

1 There are a number of things students may say in response to Question 1. Electrical problems or the presence of dangerous goods in the cabin or in the hold are likely causes. Students can share their knowledge of different incidents in response to Question 2. It is almost certain that they will have received some training concerning this important threat to safety. They can describe their own training experiences in response to Question 3.

2 The incidents described in the text have actually happened. While some had harmless consequences, the accident described in B was very serious.

1 E 2 C 3 H 4 G 5 A 6 F 7 B 8 D

3 1 T 2 T 3 F 4 F 5 F 6 F 7 T 8 F

Vocabulary – Collocations related to fire

Encourage students to attempt this matching activity without looking back at the text. They may ask other students or you for some help in completing the activity correctly. Be ready to provide clues, but avoid explaining any of the meanings until everyone has the correct answers.

Then ask students to go back to the text, to underline the collocations as they appear, and to spend a few minutes studying the use of these words within the contexts of the reported incidents. If there are any terms whose meaning is not clear, then be ready to explain them to students.

Finally, ask all students to close their books and quiz them on the words they have just studied. Some example prompts:

- *someone who smokes carries this*
- *something which burns very easily*
- *this device alerts the crew if someone lights a cigarette in the toilet*
- *substances causing damage by chemical action*

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

Functional English – Obligation, prohibition and permission

Before beginning this section you could review the modal structures used to express these functions. The structures you should present are:

- *can / can't*
- *must / mustn't*
- *have to / don't have to*
- *allowed to / not allowed to*

In the context of regulations in the aviation industry, *have to* is normally used instead of *must* as the obligation comes from an external source (a regulatory body). Often students will try to use *don't have to* for prohibition, when they need to use *mustn't*. It is worth teaching the difference between these two structures.



You might like to conclude by teaching the terms *prohibited*, *illegal* and *breaking the law*. While these three terms are often used interchangeably, *prohibited* can refer to something which isn't allowed by an airline but isn't necessarily illegal. Having said that, breaking the rules set by airlines is a criminal offence in most countries.

- 1 🗣️ 01 The spokeswoman is quite clear in blaming the irresponsibility of some passengers for incidents which occur. But she also makes the important point that airlines must assume that some passengers will try to bring dangerous goods on board and they need adequate procedures to prevent them from doing so. Her conclusion is that airport staff should be better trained. It would be interesting to ask students if they think that this is the case in their own country as well.

- 1 Not many
- 2 hardly any
- 3 dangerous goods

🗣️ 01 Listening script

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

- 2 🗣️ 01 Point out to students the use of the word *let* in Sentence 6, in the expression *let something on board*. Explain that *let* means 'allowing to pass through the check' and is used for goods which are actually permitted. Or it is used for dangerous goods, as in Sentence 6, if security personnel make a mistake.

- 1 can, can't
- 2 mustn't
- 3 illegal
- 4 allowed to
- 5 have to, breaking the law
- 6 let

Speaking

This activity provides practise of the language presented in Functional English.



Section two – Smoke-jumper

This section describes an aerial fire-fighting service. The students listen to a reporter talking to a team as they go into action. This section teaches the vocabulary relating to firefighting, as well as the language functions of orders and requests.

- 1 This activity presents the key vocabulary used to describe the different stages involved in dealing with a fire.

When checking the answers, point out that *go out* is intransitive, i.e. it is the fire which goes out. Point out also that *contain a fire* differs from *extinguish* or *put out a fire*. The fire may continue for a long time after it has been brought under control, but it is no longer a serious threat.

(Suggested answers)

start	continue	stop
catch fire	spread	contain a fire
explode	smoulder	extinguish a fire
ignite	burn	put out a fire
		go out
		spray fire-retardant liquid

- 3 1 They would operate in hot, dry areas with a lot of trees.
2 When they spot a fire or are called to a fire, the air tanker drops water on the fire, and members of the team parachute down to cut down trees, spray liquid, etc. to stop the fire spreading.

- 4 02 The interviewer is on the ground and then later on board an aircraft with the people who are about to carry out a very dangerous job. This makes for an interesting contrast between the direct operational commands given to the smoke-jumpers and the interviewer's polite requests for information about their work.

Note that the pilot is operating in a very different environment from the pilot of a commercial airliner because the pilot's life is constantly at risk. However, there are some similarities with a commercial airline pilot. The pilot's major concern is for the safety of the passengers, in this case the smoke-jumpers. Also, it is clear that there is a strong team spirit on board. This is also a necessary condition for the safe operation of a commercial flight, especially in an emergency situation.

It is interesting too that the smoke-jumpers appear to enjoy their work. There is a degree of excitement and adventure for all members of the team that civilian pilots and controllers do not experience in their routine work. Your students may find it interesting to compare and contrast their own work with the work of this team.

The three people are a smoke-jumper, an operations manager and an air tanker pilot.

02 Listening script

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

- PA** All jumpers. We have a 1 km² fire 82 km south-west. Get suited. Get your full kit. Line up for inspection. We have a 43 departure.
- R** It's a hot summer's day in the far east of Russia, and I'm on my way to a wild fire. I'm here with the aerial fire service, who fight the many fires that burn through the forests of northern Asia. Andrei Jachmenkov is a smoke-jumper. Andrei – Could you describe your work to us?
- S** I jump to the ground to bring the fires under control. It's dangerous work – you have to be fit, both mentally and physically. And you have to keep a cool head and make fast decisions.
- R** The fire service looks after hundreds of square kilometres from the Arctic to the borders of Mongolia. When the office receives a report of smoke they scramble an airborne fire-fighting team. At least four smoke-jumpers are dropped to cut away the vegetation to contain the fire, and air-tanker pilots tackle the blaze by spraying the area with water or fire-retardant liquid. I have here operations manager, Alex Letov. Alex – Would you tell us how fires are caused?
- O** Sometimes the fires are started by people. For example, this spring an industrial gas tank exploded, causing a serious wild fire. But our typical fires are ignited by lightning storms, and because the forest gets very dry over the summer, the trees catch fire easily and fires can spread over a large area quickly. But September and October is definitely our busiest time of year, before the winter rain and snow arrives. We have to respond early to the fire, when it's much more manageable ... much easier to put out.
- R** Tatyana Dubrova flies an Antonov 2 for the fire service.
- P** When that siren goes ... that's when the job really begins. I have to try to get a low altitude and air speed for the jumpers and all the time think of the terrain, the trees, the wind. I sometimes have to make two or three traffic circuits to make a safe drop.
- R** The jumpers are getting ready to drop into the forest. Andrei – Can you talk about your work on the ground?
- S** We have to make absolutely sure the fire has gone out. Extinguishing it completely can take days. The most difficult part is finding a road so you can get out of the forest again. OK, here we go ...
- P** Jumpers, don't talk. Get ready ... drop zone! Jump! Go! One! Two! Jumpers away ...



- 5 02 This activity checks students' comprehension of details in the radio feature. If necessary, play the radio feature several times.

- 1 Siberia
- 2 natural phenomena
- 3 the forest is dry
- 4 Autumn
- 5 sometimes has to make two or three circuits
- 6 finding a way out of the forest

Functional English – Orders and requests

- 1 03 Introduce this activity by eliciting or presenting to your students some of the differences between orders and requests:

Orders

- direct
- imperative form of verb (the infinitive without to)
- *don't* + imperative (for ordering someone not to do something)

Requests

- less direct
- more polite

After students complete the activity, ask them to identify which sentences are orders (Sentences 1, 2, 6) and which are requests (Sentences 3, 4, 5). Then elicit the language features in the sentences that differentiate requests (*Could you / Would you / Can you*).

- 1 Get
- 2 Line up
- 3 Could you describe
- 4 Would you tell
- 5 Can you talk
- 6 don't, Get

03 Listening script

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

- 2 It should be clear from the context that orders are to be preferred to polite requests for operational situations in which time is limited. This would be the same on board a commercial airliner. Simple, clear, direct language is the most efficient way to proceed. Phraseology used in routine situations between pilots and controllers is based on this principle.

However, polite requests will have their place in particular contexts, and it is worth ensuring that students have the ability to use such language. Sometimes, in a non-routine situation where controllers and pilots have some time to discuss the best course of action, the building of confidence between both sides may be facilitated by the use of polite language.

3, 4, 5;

- The speaker uses *Would you / Could you / Can you*.
- The speaker sometimes uses *please*.
- The speaker uses higher intonation.

- 3 03 After listening and repeating, get students to say other orders and requests to the class, using the correct language structure and intonation.
- 4 Explain to students that *get* is a very useful word in general English and is frequently used by English speakers.
- 2 Get some water!
 - 3 Get away from the aircraft!
 - 4 Get out!
 - 5 Get a fire extinguisher!
 - 6 Get your mask on!
- 5 Give students time to prepare some orders and requests. Then in groups get them to say their orders and requests. The rest of the group carries out a request but not an order.

Speaking

If your students have an aerial fire-fighting service in their country, this could be a very interesting subject to discuss. You may want to set this activity as homework, so that students can do some research into their own country's service, or that of another country. They will have a lot more to say if given the chance to prepare in advance. You could also ask students to research how aerial fire-fighting services recruit people and what qualifications and experience are required.

You could extend the second question further by asking your students to talk about other interesting contexts in which pilots and controllers work (e.g. the military, humanitarian relief operations).



Section three - On-board fire


This section deals with an incident in which a fire occurs on board an aircraft. It presents and practises the difference between the two sounds /l/ and /r/. It also teaches the language functions of identifying and responding to problems. These functions are clearly of importance to pilots and controllers in any emergency situation.

- 1 If you think your students will find this difficult, get them to work in pairs or groups and then write their suggested answers on the board without correcting them. You can check the answers after doing Activity 3.

- 1 overheated
- 2 set off
- 3 overloaded
- 4 come loose
- 5 short-circuit
- 6 trips, reset

- 2 The students may offer different suggestions depending on the situations they imagine. A fire on board an aircraft is one of the most dangerous situations a crew can face. While it is true that the pilots should try to land as soon as possible, at the same time the cabin crew ought to do what they can to fight the fire.

Land the plane – the most important factor in loss of life in on-board fires is the delay from when the fire is first discovered to landing.

- 3  **04,05,06** This incident is an illustration of correct procedure for dealing with on-board fires. Once the pilots realize that they have a serious fire on board, they make immediate plans to land as soon as possible. They put on their oxygen masks and, although it is not specifically stated in the dialogue, the cabin door would be firmly closed to ensure that their own ability to control and land the aircraft is not impaired by fumes coming from the cabin. The cabin crew make some initial efforts to tackle the problem. It is interesting that the pilot warns the cabin crew manager not to go too far in these efforts – *don't get yourself incapacitated* is the instruction. It is important that the cabin crew stay away from the danger area so that their ability to look after the passengers is not hindered.

Note that the cabin crew manager is often known as the purser or chief steward.

The crew:
put on their oxygen masks.
investigate the cause of the fire.
try to extinguish the fire.
initiate an emergency descent.

04 Listening script

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

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

05 Listening script

PF What was that? This isn't right.

PNF What's happened?

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

PNF Where's the problem?

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

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

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

PNF OK?

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

PNF Could you move the passengers away?

CCM Sure, will do.

PNF Go have a look.

CCM I'll check it out now.

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

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

PNF What do you think caused it?

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

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

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

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

06 Listening script

CCM I can't get back there.

PNF Why not?

CCM The smoke's too heavy.

PNF Are the passengers OK?

CCM People are starting to have trouble breathing.

PNF We have to go down.

PF Initiating an emergency descent.



4 04,05,06

- 1 Three circuit-breakers trip.
- 2 A fan that has overheated.
- 3 From one of the washrooms.
- 4 They move them away from the washroom area.
- 5 loose wiring or an overloaded outlet
- 6 goggles

Pronunciation – /l/ and /r/

1 / 2 / 3 07 Differentiating between these two sounds can be difficult for certain nationalities, other students may find the activities quite straightforward.

1 07

- 1 A 2 B 3 A 4 B 5 B 6 A

07 Listening script

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

4 A fun way to end this pronunciation activity is to ask the students to repeat the phrase *red lorry, yellow lorry*, slowly at first. If they master it, you can ask them to try repeating the phrase progressively faster, and then to repeat the phrase several times in succession at high speed.

Functional English – Identifying and responding to problems

After students have done Activities 1 and 2, you could elicit and write on the board the following summary to prepare students for the speaking activity:

Language for asking about a problem:

What was that? / What's happened? / Where's the problem? / Why (not)?

Language for saying what you will do:

I'll ... / We'll ...

I'm going to ... / We're going to ...

Elicit what the abbreviations 's, 'll and 'm stand for (What's happened? – has; Where's the problem? – is, I'll – will, I'm going to – am).

1 05

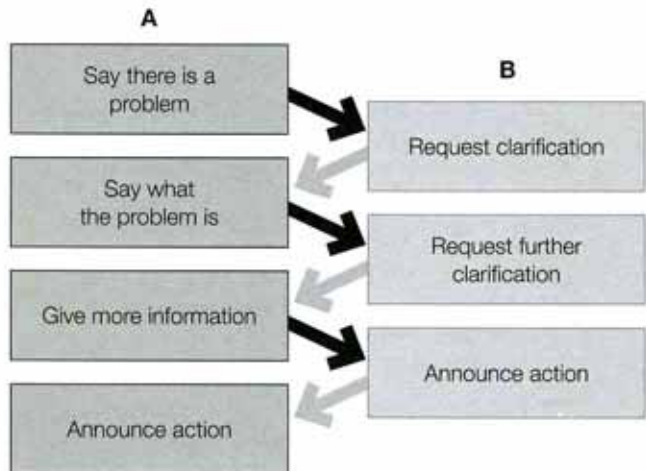
- 1 What
- 2 happened
- 3 tripped
- 4 problem
- 5 Where's
- 6 overheated
- 7 I'll ask
- 8 I'll try

2 06

- 1 can't
- 2 Why
- 3 smoke's
- 4 trouble
- 5 have to
- 6 Initiating

Speaking

1 / 2 This pattern is simple, but important, with both sides saying what they will do. It is also important that clarification is both sought and provided. Using the prompts in Activity 2, students have the opportunity to create their own emergency situations and practise them using the functional language.





Section four – Language development

Functional English – Obligation, prohibition and permission

- 1 1 prohibited / breaking the law / illegal
- 2 permitted
- 3 not allowed
- 4 breaking the law / illegal
- 5 have to
- 6 required
- 7 let
- 8 illegal / breaking the law
- 9 mustn't
- 10 can and can't

Functional English – Orders and requests

- 2 1 Tell the passengers to fasten their seatbelts immediately.
 - 2 It's very hot, so don't touch it.
 - 3 Call MedLink and tell them we have a passenger with severe burns.
 - 4 Contact the emergency services and tell them about the problem.
 - 5 Shut down number two engine
 - 6 Inform the pilot of the nearest aerodrome.
 - 7 Stop the passengers from using the washroom.
 - 8 Get out of the plane as quickly as possible.
- 3 (Suggested answers)
 - 1 Would you bring me some water, please?
 - 2 Can you find a fire extinguisher?
 - 3 Could you exit the runway, please?
 - 4 Can you fasten your seatbelts, please?
 - 5 Would you put your masks on, please?
 - 6 Can you contact ATC?
 - 7 Could you look for the fire emergencies checklist, please?
 - 8 Can you give me some more detail?
 - 9 Could you try not to disturb the pilot?
 - 10 Can you let me know where the nearest aerodrome is, please?

Identifying and responding to problems

- 4 2 Show me where the problem is.
- 3 What shall we do about it?
- 4 Are the passengers OK?
- 5 I'll try and reset them
- 6 I'll ask the cabin crew manager to look into it.
- 7 I'll contact ATC and declare an emergency.
- 8 Let's get the passengers' masks on.

Vocabulary – Collocations related to fire

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

Vocabulary from the unit

- 2 1 spread
- 2 set off
- 3 smoulder
- 4 ignite
- 5 short circuit
- 6 fire extinguisher
- 7 oxygen mask
- 8 hose



PHOTOCOPIABLE ACTIVITY

This text deals with a controversial incident which occurred in February 2005. The aim of the activity is to have students debate the issues involved. The first gap-fill activity reviews some general aviation vocabulary. It also acts as a check that the students have understood the text, before they move on to a discussion of the issues involved. There is no correct answer to the main question about the pilots' decision and experts remain divided. The incident was investigated and the airline was not found to be at fault, though the pilots were mildly criticized for mishandling their fuel planning.

Key

- | | | | | |
|-------------|--------------|-----------|-----------|---------------|
| 1 shut | 3 fuel | 5 bang | 7 failure | 9 regulations |
| 2 emergency | 4 passengers | 6 circled | 8 return | 10 alerted |



- 1 Read and complete the text with the words in the box.

alerted bang circled emergency failure fuel passengers regulations return shut

Jumbo flies across the Atlantic on just three engines

A Boeing 747 had to (1) _____ down one of its four engines just after taking off from Los Angeles on a flight bound for Heathrow airport. The aircraft subsequently continued its flight to London. It eventually needed to make an (2) _____ landing in Manchester, due to concerns over low (3) _____ levels. Some aviation safety experts have questioned the decision of the pilots to continue with the flight rather than returning to Los Angeles. The airline issued a statement saying that safety was not compromised at any time, and that the aircraft was able to operate on its three remaining engines with no risk to (4) _____.

Air traffic controllers and local residents saw sparks coming from the engine and passengers reported hearing a loud (5) _____ just after take-off. The aircraft climbed to 5,000 ft and (6) _____ for some time while the pilots decided what to do next. They informed passengers of the engine (7) _____ and contacted their company offices to discuss the situation. They then took the decision to continue the flight.

Critics have claimed that the pilots might have been under commercial pressure to take this decision, as a (8) _____ to Los Angeles airport would have left the airline with an expensive bill for compensating the 351 passengers on board. Under new European (9) _____, this bill could have been as high as \$200,000. The airline, however, denies that this was a factor in the decision taken to fly on across the Atlantic.

Controllers at Los Angeles airport were apparently surprised at the pilots' decision to carry on. They had (10) _____ fire services in the expectation that the aircraft would return. Comments from safety experts have varied. Some claim that it is not a problem to lose one engine on a four-engine aircraft. They point out that there are lots of twin-engine aircraft crossing the Atlantic. Others are convinced that the new European regulations will inevitably increase the pressure on pilots in such situations. The debate is likely to continue.

- 2 Work in pairs. Discuss the following questions.

Do you agree that the pilots were under commercial pressure?

Would you have wanted to continue the flight to the UK if you had been a passenger on this flight?

Do you know other airlines' policies about what to do in such situations?

At the moment there is no international regulation on this particular issue, do you think there should be?

- 3 Discuss the following question as a class.

Do you think that the pilots made the correct decision?



Introduction

Weather is of crucial importance to pilots, both in flight planning and in the safe operation of a flight, and it affects all phases of flight. Modern aircraft are undoubtedly much better equipped to deal with different meteorological conditions than the machines which took to the air in the early days of powered flight. Weather reports are also a lot more reliable. None the less, pilots of today's jet airliners need to deal from time to time with several potential dangers presented by bad weather.

VFR flights (see introductory notes to Unit 2) are much more dependant upon good weather. Indeed VFR flying is only permitted in **VMC (Visual Meteorological Conditions)**, that is in conditions of clear visibility when the pilot can both see and be seen. Nevertheless, frequently a VFR pilot will take off in VMC but conditions change to **IMC (Instrument Meteorological Conditions)** for which he / she is neither equipped nor qualified. A VFR pilot who is not assured of suitable weather conditions along the planned route should not leave the ground. IFR flying is possible in most weather conditions but there are still some constraints, e.g. no pilot, no matter how well-trained, nor how sophisticated their aircraft might be, should knowingly fly through a thunderstorm.

Weather reports

Clearly weather reports are of great importance to pilots. They need to be informed of the conditions at the departure airport, along their planned route (known as a **route forecast**) and at their destination. Weather conditions can change and pilots need updated weather reports. **PIREPs (pilot reports)** are sent by pilots who have recently flown through an area and can keep other crews usefully informed. **Terminal aerodrome forecasts (TAF)** are continually updated and allow pilots to predict the weather at their destination.

Air traffic controllers will always relay whatever important up-to-date weather information they have to pilots, but the responsibility for the decision to take off from or land at a particular airport rests firmly with the pilot. This was the subject of some debate after an Airbus A340 accident in Toronto (mentioned in the introductory notes in Unit 7). Prior to this accident, Toronto airport had been closed for a short period due to the high winds and storm activity that day. It had recently reopened, but the decision to reopen the airport did not mean landings were safe and the position of the Canadian authorities was (as always in such cases) that landings were at the pilot's discretion. In the light of what happened, the general opinion was that it would have been safer to divert to another airport.

Wind and wind shear

Forecast wind strength and direction is a major factor in flight planning, and the navigation will need to be constantly updated to take into account the actual wind experienced (see introductory notes to Unit 2). Aircraft should, as far as possible, land into the wind. Crosswinds can make landings much more difficult but they may be unavoidable at an airport which has only one runway, or two or more parallel runways.

Another danger presented by wind is the phenomenon known as **wind shear**. This occurs when two winds moving in opposite directions meet. The result can be severe turbulence and a loss of control. While wind shear can occur at any altitude, an airplane is most vulnerable when it is coming in to land. When wind shear can be predicted, it will be less threatening than when it occurs suddenly and the flight crew are unprepared. Controllers will do their best to warn pilots of any known wind shear activity near their airport. A pilot who is forewarned of this danger will almost always choose to **go around**, that is to climb and try to reposition for another attempt at landing, or to divert to another airport. A good example of this is illustrated by the incident in Section 3.

Microburst is another danger to aircraft attempting to land. A full description of this phenomenon is detailed in Section 1.

Low visibility

Air traffic can come to a complete halt at a fogbound airport. IFR traffic can usually take off reasonably safely in fog, but the problem is that landings may not be authorized until the fog lifts, thus effectively paralysing the airport (no inbound aircraft eventually means no outbound aircraft). This is especially the case for smaller airports. The regulations concerning landing in low visibility depend on the navigational aids available at a particular airport, the type of aircraft involved and the qualifications of the pilot. At a well-equipped airport it is possible to land even if the pilot cannot see the runway beforehand. For smaller airports and less well-equipped aircraft, visibility will need to be **above landing limits**, that is there is a minimum altitude at which the pilot will need to be able to see the runway. There will also be a stricter requirement for **RVR (Runway Visual Range)**, which is visibility along the runway once a pilot has landed.



Ice and snow

Ice or snow on a runway present obvious dangers to aircraft as they greatly increase the possibility of a runway overrun, that is skidding off the runway. Even worse, they could slow down an aircraft during its take-off roll. The airport authorities have a major responsibility to either keep runways clear of ice or snow, or to close a runway in conditions where this becomes impossible.

Icing

Ice building up on an aircraft's wings can greatly reduce the available lift and thus cause it to stall. Before an aircraft attempts to take off in icing conditions, it needs to be **de-iced** as reduced lift at take-off could be catastrophic. Special vehicles exist at airports for this fairly routine operation and it needs to be performed just prior to take-off as ice can build up again quickly. Once airborne, most commercial airliners are able to keep the wings free of ice by routing the heated air from the engines through the leading edges of the wings.

For smaller aircraft the risks are higher and pilots will need to avoid exposing their airplanes to icing conditions when in the air. If they notice ice building up on the wings, they will need to quickly descend to a warmer altitude where the ice will melt.

Storms, lightning and hail

Pilots will do what they can to avoid flying through a storm. Normally if there is a storm around an airport, controllers will warn pilots that take-off is at their own risk and this is a risk that pilots are trained not to take. For the pilot, the passengers and the airline, the financial costs of a delay are clearly to be preferred to the safety risks in choosing to take off. When an airplane is coming in to land, a decision not to land at that airport and divert elsewhere should be based on exactly the same principle of safety first. No pilot should take a risk, but it is important to recognize that the temptation to do so does exist as landing at another airport will be inconvenient for the passengers and crew as well as costly for the airline. Human factors training alerts pilots to the dangers of being swayed by such considerations.

Pilots are frequently alerted to the dangers of storms en route and do their best to navigate around them. Occasionally though, they can find themselves in the middle of a storm. Passengers would experience **severe turbulence** in such a case. There is also the danger of being struck by lightning. Most modern aircraft can resist such a strike but it is a rather frightening experience for the passengers.

Being caught in a hailstorm can cause structural damage to the aircraft, depending on how big the hailstones are. Flight crews are particularly alert to this danger.

for fun



When airports become too congested and delays build up ...

Pilot: Good morning, Gatwick ground, Sabena 682 request start up and push back, please.

Tower: Sabena 682, weather delays, expect start up in two hours.

Pilot: Please confirm; two hours delay?

Tower: Affirmative.

Pilot: In that case, cancel the good morning!



METEOROLOGY



Section one - Microburst

This section deals with the meteorological phenomenon known as microburst. The reading text gives a detailed explanation of what a microburst is, how it was discovered and what precautions a landing aircraft can take against this danger. The section also teaches the language function of changing the strength of adjectives.

- 1 Before students begin this activity, elicit the words *headwind*, *tailwind* and *lift*, in order to check that they are familiar with these terms. Ask students what they think a *downdraft* is (a downward current of air), and be ready to explain this if necessary.

Note that the *glide path* marked on the diagram shows a constant rate of descent. It is the line along which the aircraft should normally approach the runway. The *flight path* marked shows what can happen to an aircraft caught in a microburst.

1 D 2 B 3 A 4 E 5 C

- 2 Before students read the text, you could ask them to discuss the following questions with a partner:

What happens when an aircraft on final approach flies into a microburst?

What can a pilot do to survive a microburst?

The students will answer similar questions in Activity 3, after reading the text a second time. They then will be able to compare what they thought beforehand with the explanations given.

Note that the third sentence in the second paragraph (*A low-flying airplane ...*) is the key to understanding the potentially fatal consequences of a microburst. Lift is created by the strong headwind. When the wind direction suddenly changes and there is a strong downdraught, a low-flying aircraft can plunge to the ground in a matter of seconds.

1 F 2 T 3 F 4 T

- 3
- 1 It made the speed increase then decrease dramatically.
 - 2 They pushed the nose down.
 - 3 Students' own answers
 - 4 The aircraft's speed rises and falls.
 - 5 The trees were blown outward from a single point.
 - 6 Go to full power and point the nose upward.



Functional English – Changing the strength of adjectives

Ask students to do both Activities 1 and 2 before presenting the following table:

–	<i>not at all</i>	negative sense
+	<i>quite / fairly</i>	moderate
++	<i>very / (really)</i>	strong
+++	<i>extremely / (absolutely)</i>	the strongest

The above adverbs are all used to change the strength of adjectives. Note adverbs in brackets are used with strong adjectives, e.g. *really huge*.

- 1**
- 6 really / absolutely huge
 - 2 quite / fairly / pretty big
 - 5 huge
 - 3 very / really big
 - 1 not big at all
 - 4 extremely big

- 2**
- 1 absolutely
 - 2 extremely
 - 3 quite
 - 4 really
 - 5 pretty

Speaking

This activity provides free speaking practice around the subject of difficult meteorological conditions. If there are some trainees in your class, then they may not be able to share first-hand experiences, but they should still be able to talk about a story they have heard of during their training. Some vocabulary that will be dealt with in Section 2 may have to be supplied to the students during this activity.



Section two – Airport disruption

This section deals in depth with the vocabulary of meteorology, through listening activities which describe both general and particular weather conditions at different airports around the world. It also teaches the language functions of discussing results and consequences and asking someone to repeat information.

- 1 Before students open their books, elicit weather conditions which can cause problems for both pilots and controllers. They may mention most of the weather conditions presented in Activity 1, though they might not know the English words and will have to paraphrase in order that you can supply the correct terms.

Depending on what part of the world your students come from, they may not mention *monsoon*, so you should be ready to explain this.

thunderstorm	C
gale	B
monsoon	A
fog	D
hurricane	E
hailstorm	F

- 2 This activity provides students with controlled practice of the vocabulary presented in Activity 1. There may be different opinions as to the most appropriate answers. For Question 1 students might mention hot, humid weather with less seasonal changes. For Question 3, explain that students should think of weather patterns in continental land mass with hot summers and very cold winters.
- 3 If your students are quite strong on meteorological vocabulary, you could have them close their books, read out the definitions and ask them to write the words. If you do this, you might elicit some synonyms instead of the words in the book, e.g. *cloudy* for *overcast*, *humid* for *sticky*, *unpredictable* or *changeable* for *unstable*.

If students do the activity as a direct matching activity, teach these synonyms after they have finished.

1 c 2 a 3 e 4 d 5 b

- 4 08 If you think students would benefit from further controlled practice of the vocabulary learned so far, ask them to speculate on the weather conditions at the three locations marked.

Bristol 1
Almaty 2
Kerala 3

- 5 08 Students may need to listen several times to complete all the information in the table. Spend as long as necessary on this activity as the ability to correctly understand meteorological information is a critical skill.

	Bristol	Almaty	Kerala
Winter	overcast drizzle	cold snow	mild
Summer	clear warm	hot sticky humid thunderstorms	heavy rain humidity
Prevailing wind	south-west	northerly	south-west
Warning	standing water slippery	rough approaches	difficult to predict heavy rains flooding

08 Listening script

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

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

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



Vocabulary – Weather words

This activity reviews the use of adjectives to describe weather, many of which appeared in the previous listening.

As you check answers, explain that these pairs of words are collocations, e.g. we say *strong wind* and *heavy rain*. Suggest students memorize these collocations.

- 1 humid / good / stormy / freezing
- 2 smooth / rough
- 3 clear / overcast / stormy
- 3 mild / strong / light
- 5 heavy / light
- 6 good / poor

Functional English – Results and consequences

- 09 After students have listened and checked their answers, you could present the following four general structures. Students will need to understand these different structures when they hear them.

Reassure them that it is not necessary to be able to produce all these different patterns. If they don't seem confident, tell them that *therefore* is possibly the easiest to use correctly.

- As a result of + (cause – noun) + (consequence – phrase) OR (consequence – phrase) + as a result of + (cause – noun)

Note: *because of* and *due to* behave similarly

- (cause – noun) + lead(s) to + (consequence – noun)
- (cause – phrase) + therefore + (consequence – phrase)
- As a consequence + (consequence – phrase)

Note: this is used when the cause has just been explained. *Therefore* at the beginning of a sentence behaves similarly.

- | | |
|---------------|-------------|
| 1 As a result | 4 leads to |
| 2 due to | 5 therefore |
| 3 because of | 6 As a |

09 Listening script

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

Listening – Weather forecast

- 1 Encourage students to use all the structures presented in Functional English, even if they eventually choose to remember just one or two ways in which to express consequences.

2 10

- | | |
|------------------|------------------|
| 1 approach | 3 upper airspace |
| 2 night, evening | 4 eastbound |

10 Listening script

ASS = airport controller, ATC 1 / 2 = air traffic controllers 1 / 2

- ASS** OK everyone. We've got a severe weather front coming at us on tonight's shift. We have a big storm coming in from the north with strong westerly winds and gales, hail and heavy snow. All of the control positions are going to be affected.
- ATC 1** Sorry sir, I didn't catch the word before 'control positions' – did you say all of the control positions? Is it that bad?
- ASS** I'm afraid so – it's going to be a busy evening, especially for those working the approach position. Lots of aircraft will want to land or divert before the snow starts.
- ATC 2** Excuse me, I couldn't hear that last bit.
- ASS** We've got some heavy snow approaching and we'll have to get incoming aircraft down quickly or help them to divert. I hope it's going to get easier as the traffic volume decreases during the night. For tower, the night and morning shifts are going to be easier.
- ATC 2** Sorry, sir – What did you say after 'morning shift'?
- ASS** It's going to be easier, because traffic is not going to move at the airport until tomorrow afternoon. The upper airspace is going to be very quiet over the next 12 hours as many flights are grounded.
- ATC 1** I'm sorry sir. What was the first part of the sentence?
- ASS** To repeat – the upper airspace is going to be quiet during the next 12 hours because many flights will be grounded. For eastbound aircraft, it's not going to be easy flying into Bristol today, so we'll have to work hard to get this traffic coordinated. Now, any more questions? No? Then good luck everyone.

Functional English – Asking someone to repeat information

- 1 11 Both pilots and controllers use the phrase, *say again* when they need repetition of a routine phrase. The problem is that in a non-routine situation they may have received a message that they only partially understand. In such cases it is important to be able to focus on and ask about part of the message.

- | | |
|-----------------|---------------|
| 1 didn't catch | 3 did you say |
| 2 couldn't hear | 4 What was |

11 Listening script

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

- 2 This activity provides controlled practice of the above expressions.

Speaking

Pilots may have more to say in relation to an airport they visit regularly, rather than the airport they are based at. Allow them the choice of which airport to talk about.



Section three – Stormy approach

This section deals with an incident in which there is a thunderstorm overhead and a warning of microburst activity is issued to an aircraft coming in to land. It teaches the language function of warnings and practises the pronunciation of sounds /f/, /z/, /tʃ/ and /dʒ/ which are often confused.

- 1 Refer to the introductory teaching notes for this unit where wind shear was discussed in order to be prepared for what your students may say in response to Question 1. In response to Question 2, students will probably tell you that departing aircraft should wait until conditions have improved, and that arriving aircraft should either go around or divert to another airport.

(Suggested answers)

- 1 Wind shear is a change in wind velocity at right angle to the wind direction. It is difficult to detect because it is very sudden and difficult to see.
- 2 airports use radar and wind sensor systems, some aircraft have wind shear detection systems, pilots can request PIREPS reports

- 2 12 Note that the aircraft marked a, Company 737, has just landed safely and exited the runway.

1 b 2 c 3 a

12 Listening script

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

- E** Shenton tower. ES23. We're ready for departure but we can see lightning out to the right. Can we ... er ... wait here until the weather passes? ES23.
- C** ES23. Affirm. Hold short of runway. Stand by.
- E** Holding short of runway. ES23.
- C** Quickair 638. Tower and departing aircraft observe increasing rain and lightning south-west of the field. Amend your altitude ... maintain 2,000.
- PNF** Maintaining 2,000. Quickair 638.
- PF** That's the edge of the storm to the left of the airport. Can we get a report on the weather?
- PNF** I'd appreciate a PIREP from the company traffic in front of us. Quickair 638.
- C** Quickair 638. Roger. Stand by. ②
- Quickair 638, Company 737 just exited the runway, sir. He said 'smooth ride'.
- PF** Say again. Quickair 638.
- C** Quickair 638, Company 737 said 'smooth ride'.
- PF** Roger, smooth landing conditions. Thank you. Quickair 638.

- 3 12 A PIREP report means a report from another pilot. Controllers have meteorological information to pass on to pilots, but the final decision to land, as well as the responsibility for this decision, always rests with the pilot. Before taking the decision that a landing can take place safely, a pilot will often wish to solicit the opinion of another pilot who has recently landed.

1 wait 2 to the left of 3 pilot report 4 smooth

- 4 13,14 This second part of the dialogue is a clear illustration of how conditions can suddenly deteriorate. The pilot report transmitted from Company 737 indicated that conditions were safe enough to land, but in the second part of this dialogue, rapidly increasing wind speed becomes a major concern.

1 F 2 T 3 T 4 F 5 F 6 F



13 Listening script

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

14 Listening script

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

- 2 / 3** **16** After students have completed Activities 2 and 3, you could ask them to work in small groups and add several more words to each column in the table. They then pronounce these new words for the rest of the class. Allow the other students to decide if they have been placed in the correct column and pronounced correctly, intervening only when necessary.

/ʃ/	/z/	/tʃ/	/dʒ/
threshold	measure	approach	edge
shear	usual	switch	emergency

16 Listening script

approach
edge
measure
switch
threshold
emergency
usual
shear

Functional English – Warnings

- 1** **14** Students will need to understand all the different expressions for issuing warnings in English, even if they themselves use the same one all the time.
- Be on the alert for
 - Watch out for
 - Be careful
 - Looking out for
- 2** This activity provides students with controlled practice of the language of warnings.

Pronunciation – /ʃ/, /z/, /tʃ/, /dʒ/

- 1** **15** Students often confuse these four sounds. This activity helps them to first hear the differences between the sounds and then practise the correct pronunciation of each sound.

15 Listening script

short visual watch roger

Speaking

- 1 / 2** These activities provide students with controlled practice of the vocabulary taught in the unit.

After they have practised the dialogue and changed roles, you could ask each pair to construct another landing scenario like the one at Kerala airport, but at a different airport with a different problem. They then exchange the scenarios they have written with another pair. In this way all students can benefit from further controlled practice.



Section four – Language development

Functional English – Changing the strength of adjectives

- 1 **small** – minute, slight, tiny
big – enormous, huge, massive
quite – fairly, pretty, relatively
very – exceptionally, extremely, really
completely – absolutely, entirely, totally

Results and consequences

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

Asking someone to repeat information

- 3 1 I didn't catch the first part of the sentence.
 2 I didn't get that.
 3 Can you repeat that last bit?
 4 What did you say after 'hailstorm'?
 5 What was the word that you said before 'conditions'?
 6 I'm sorry, I didn't catch that.

Warnings

- 4 1 Be on the alert for
 2 Watch out for
 3 look out for
 4 be careful of
 5 vigilant
 6 be prepared to
 7 prepare for
 8 listen carefully
 9 pay attention to
 10 Beware of

Vocabulary – Weather words

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

Vocabulary from the unit

- 2 1 black ice
 2 bumpy
 3 dew
 4 thunder
 5 drizzle
 6 frost
 7 gale
 8 hailstone
 9 lightning
 10 sleet
 11 slippery
 12 slush



PHOTOCOPIABLE ACTIVITY

Either hand out the questions separately or ask students to cover the text. As a pre-reading activity ask students to discuss the questions about landing in Antarctica without giving them any hint as to what the text is about. It will be interesting to compare their initial ideas with the text.

The vocabulary activity and the true / false questions are designed to check the students' comprehension of the text.

Students may be interested in discussing whether or not in the future this project will have some tourist potential and whether this is desirable from an environmental point of view.

Key

- 2 1 crosswinds 3 maintenance 5 winds 7 fuel 9 equipment 11 military
 2 pull up 4 temperatures 6 environment 8 construction 10 reduced 12 aviator
 3 1 F 2 F 3 T 4 T