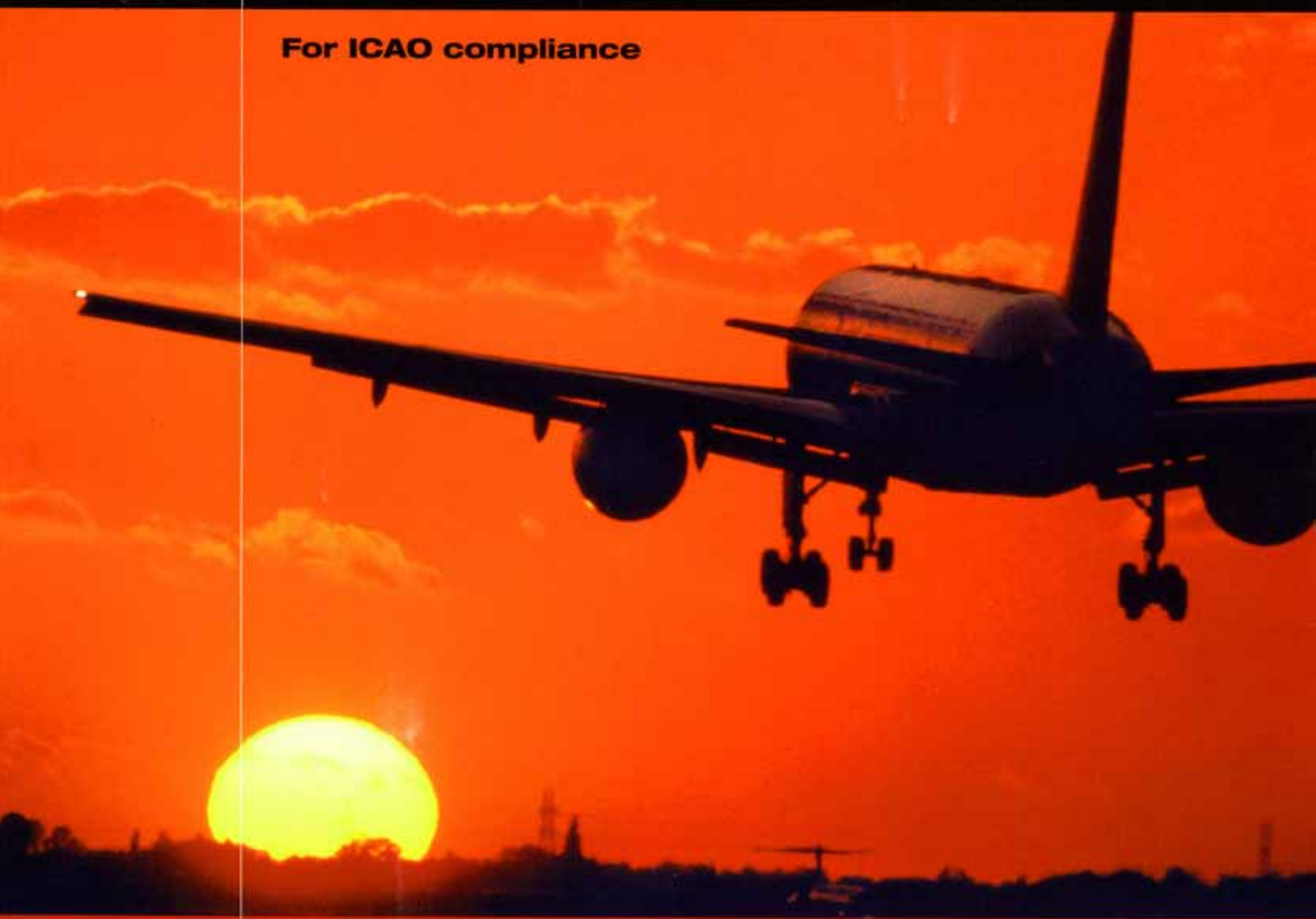
Aviation

ENGLISH

For ICAO compliance



Henry Emery & Andy Roberts

MACMILLAN

Aviation

ENGLISH

For ICAO compliance

Henry Emery & Andy Roberts

with Ruth Goodman and Louis Harrison

MACMILLAN

INTRODUCTION

This course is for aviation professionals – particularly **pilots** and **air-traffic controllers** – who wish to reach and maintain level 4 (operational) as measured by the **ICAO Language Profile descriptors** (see pages vi and vii). The course aims to increase confidence in communication and develops the very specific skills described in the **ICAO level 4** language profile. These are the skills needed to succeed in any Level 4 assessment and also to function effectively and safely in an aviation environment.

This course does not aim to teach the phraseology that aviation professionals need but it is included to provide a context for the plain English needed for communication between pilots and air-traffic controllers, and between pilots and pilots. The main focus is on the language needed to communicate in non-routine and / or emergency situations during flight operations.

The Student's Book contains the material for the course in the form of reading and listening texts. The main purpose of this is to present new vocabulary and to provide a context for the exercises and language functions. There are lots of pair-work and group-work activities for speaking practice for the benefit of students using the course in a classroom situation.

The course is intended both for **independent study** and for classroom use. The CD-ROM supports the student's book with interactive language and pronunciation exercises, simulations in which the student can participate, and all the audio files from the Student's Book. The Teacher's Book contains extra support and ideas that can be used to supplement the material contained in this Student's Book.

STUDENT'S BOOK

Each of the 12 units in the Student's Book is divided into four two-page sections.

Section 1

is based on a reading text and provides an introduction to the main theme of the unit.

Section 2

is based on a listening text or texts and provides sustained listening and pronunciation practice work.

Section 3

is based on an emergency or non-routine flight operation scenario. It always contains a listening text or texts involving a radio telephony exchange with a mixture of phraseology and plain English.

Section 4

is an extension section which includes further practice, consolidation and extension of language taught within the unit.

CD-ROM

The interactive CD-ROM complements the material in the Student's Book by providing interactive simulations, detailed pronunciation and extra listening. The CD-ROM material is split into 12 units which match those of the Student's Book. It has two sections.

Section 1

contains further practice on pronunciation and listening,

Section 2

contains animated interactive sequences in which students are encouraged to use the language taught in the corresponding unit of the book. Students can compare their own speech with model responses and take the role of characters in the animation.

We hope that you enjoy using Aviation English.

Henry Emery
Andy Roberts

	Topic	Skills	Pronunciation	Functions	Vocabulary
UNIT 1 RUNWAY INCURSION *Page 8*	1 Avoiding miscommunication	Reading and vocabulary		Asking for information	Communication
	2 Airport layout	Listening and speaking	ICAO alphabet		Prepositions
	3 Ground operations	Listening and speaking	Numbers	Describing actions and position	Verbs describing actions and position
	4 Language development				
UNIT 2 LOST *Page 16*	1 Across the Pacific	Reading and vocabulary		Explaining abbreviations	Navigation
	2 Finding flight N45AC	Listening and speaking	Past tense endings		Co-ordinates
	3 Lost	Listening and speaking	Confirming and disconfirming		Topographical features
	4 Language development				
UNIT 3 TECHNOLOGY *Page 24*	1 Datalink	Reading and vocabulary		Expressing purpose	Communications
	2 Flight control systems	Listening and speaking	/b/ and /p/	Saying things another way	Safety
	3 Instrument blackout	Listening and speaking	Sentence stress 1	Giving instructions	The instrument panel
	4 Language development				
UNIT 4 ANIMALS *Page 32*	1 Wildlife on the ground	Reading and vocabulary		Expressing necessity	Security measures
	2 Animals on the loose	Listening and speaking	Word endings	Expressing preferences; Explaining unknown words	Cargo
	3 Bird strike	Listening and speaking	Sentence stress 2	Saying intentions	
	4 Language development				
UNIT 5 GRAVITY *Page 40*	1 Ultralight	Reading and vocabulary		Explaining how something works	Manoeuvring an aircraft
	2 Air race	Listening and speaking		Comparing and contrasting	Aerobatics; Units of measurement
	3 Hydraulic loss	Listening and speaking	Tonic stress	Expressing difficulty and offering help	
	4 Language development				
UNIT 6 HEALTH *Page 48*	1 Is there a doctor on board?	Reading and vocabulary		Expressing cause and effect	Medical emergencies
	2 Stressed?	Listening and speaking	Consonant clusters 1	Making suggestions and giving advice	Symptoms of stress
	3 Medical emergency	Listening and speaking	Intonation of lists	Giving and asking for updates	
	4 Language development				

Pairwork, pages 104–112 Recordings, pages 113–128

	Topic	Skills	Pronunciation	Functions	Vocabulary
UNIT 7 FIRE *Page 56*	1 Fire risk	Reading and vocabulary		Obligation, prohibition and permission	Collocations related to fire
	2 Smoke-jumper	Listening and speaking		Orders and requests	Verbs for describing fires
	3 On-board fire	Listening and speaking	/l/ and /r/	Identifying and responding to problems	Electrical problems
	4 Language development				
UNIT 8 METEOROLOGY *Page 64*	1 Microburst	Reading and vocabulary		Changing the strength of adjectives	
	2 Airport disruption	Listening and speaking		Results and consequences; Repeating information	Weather words
	3 Stormy approach	Listening and speaking	/ʃ/, /ʒ/, /tʃ/, /dʒ/	Warnings	
	4 Language development				
UNIT 9 LANDINGS *Page 72*	1 Touchdown	Reading and speaking		Describing sensory impressions	Landing gear and braking
	2 Letting down a VIP	Listening and speaking	Consonant clusters 2	Describing 3-D position and movement	Verbs of movement
	3 Undercarriage	Listening and speaking		Resolving misunderstanding	
	4 Language development				
UNIT 10 FUEL *Page 80*	1 Aviation and global warming	Reading and speaking		Suggesting solutions to problems	Prefixes
	2 Gimli glider	Listening and speaking	Information groups		Fuel collocations
	3 Fuel icing	Listening and speaking	Long and short vowel sounds	Expressing expectation	
	4 Language development				
UNIT 11 PRESSURE *Page 88*	1 Blast	Reading and speaking		Expressing time and duration	Action verbs
	2 Damage	Listening and speaking	Diphthongs	Summarizing	Types of damage
	3 Emergency descent	Listening and speaking	Contrastive stress	Expressing consequences	
	4 Language development				
UNIT 12 SECURITY *Page 96*	1 Air rage	Reading and speaking		Focusing on actions	Conflict and restraint
	2 Suspicious passengers	Listening and speaking	*-tion, -sion, -cion* endings	Expressing possibility and probability	Strange behaviour
	3 Unlawful interference	Listening and speaking	Information groups and stress	Reporting	
	4 Language development				

Pairwork, pages 104–112 Recordings, pages 113–128

Level	Pronunciation Assumes a dialect and / or accent intelligible to the aeronautical community	Structure Relevant grammatical structures and sentence patterns are determined by language functions appropriate to the task	Vocabulary
Expert 6	Pronunciation, stress, rhythm, and intonation, though possibly influenced by the first language or regional variation, almost never interfere with ease of understanding.	Both basic and complex grammatical structures and sentence patterns are consistently well controlled.	Vocabulary range and accuracy are sufficient to communicate effectively on a wide variety of familiar and unfamiliar topics. Vocabulary is idiomatic, nuanced, and sensitive to register.
Extended 5	Pronunciation, stress, rhythm, and intonation, though influenced by the first language or regional variation, rarely interfere with ease of understanding.	Basic grammatical structures and sentence patterns are consistently well controlled. Complex structures are attempted but with errors which sometimes interfere with meaning.	Vocabulary range and accuracy are sufficient to communicate effectively on common, concrete, and work-related topics. Paraphrases consistently and successfully. Vocabulary is sometimes idiomatic.
Operational 4	Pronunciation, stress, rhythm, and intonation are influenced by the first language or regional variation but only sometimes interfere with ease of understanding.	Basic grammatical structures and sentence patterns are used creatively and are usually well controlled. Errors may occur, particularly in unusual or unexpected circumstances, but rarely interfere with meaning.	Vocabulary range and accuracy are usually sufficient to communicate effectively on common, concrete, and work-related topics. Can often paraphrase successfully when lacking vocabulary in unusual or unexpected circumstances.
Pre-Operational 3	Pronunciation, stress, rhythm, and intonation are influenced by the first language or regional variation and frequently interfere with ease of understanding.	Basic grammatical structures and sentence patterns associated with predictable situations are not always well controlled. Errors frequently interfere with meaning.	Vocabulary range and accuracy are often sufficient to communicate on common, concrete, or work-related topics but range is limited and the word choice often inappropriate. Is often unable to paraphrase successfully when lacking vocabulary.
Elementary 2	Pronunciation, stress, rhythm, and intonation are heavily influenced by the first language or regional variation and usually interfere with ease of understanding.	Shows only limited control of a few simple memorized grammatical structures and sentence patterns.	Limited vocabulary range consisting only of isolated words and memorized phrases.
Pre-Elementary 1	Performs at a level below the Elementary level.	Performs at a level below the Elementary level.	Performs at a level below the Elementary level.

Fluency	Comprehension	Interactions
Able to speak at length with a natural, effortless flow. Varies speech flow for stylistic effect, e.g. to emphasize a point. Uses appropriate discourse markers and connectors spontaneously.	Comprehension is consistently accurate in nearly all contexts and includes comprehension of linguistic and cultural subtleties.	Interacts with ease in nearly all situations. Is sensitive to verbal and non-verbal cues, and responds to them appropriately.
Able to speak at length with relative ease on familiar topics, but may not vary speech flow as a stylistic device. Can make use of appropriate discourse markers or connectors.	Comprehension is accurate on common, concrete, and work-related topics and mostly accurate when the speaker is confronted with a linguistic or situational complication or an unexpected turn of events. Is able to comprehend a range of speech varieties (dialect and / or accent) or registers.	Responses are immediate, appropriate, and informative. Manages the speaker / listener relationship effectively.
Produces stretches of language at an appropriate tempo. There may be occasional loss of fluency on transition from rehearsed or formulaic speech to spontaneous interaction, but this does not prevent effective communication. Can make limited use of discourse markers or connectors. Fillers are not distracting.	**Comprehension is mostly accurate on common, concrete, and work-related topics when the accent or variety used is sufficiently intelligible for an international community of users. When the speaker is confronted with a linguistic or situational complication or an unexpected turn of events, comprehension may be slower or require clarification strategies.**	**Responses are usually immediate, appropriate, and informative. Initiates and maintains exchanges even when dealing with an unexpected turn of events. Deals adequately with apparent misunderstandings by checking, confirming, or clarifying.**
Produces stretches of language, but phrasing and pausing are often inappropriate. Hesitations or slowness in language processing may prevent effective communication. Fillers are sometimes distracting.	Comprehension is often accurate on common, concrete, and work related topics when the accent or variety used is sufficiently intelligible for an international community of users. May fail to understand a linguistic or situational turn of events.	Responses are sometimes immediate, appropriate, and informative. Can initiate and maintain exchanges with reasonable ease on familiar topics and in predictable situations. Generally inadequate when dealing with an unexpected turn of events.
Can produce very short, isolated, memorized utterances with frequent pausing and a distracting use of fillers to search for expressions and to articulate less familiar words.	Comprehension is limited to isolated, memorized phrases when they are carefully and slowly articulated.	Response time is slow, and often inappropriate. Interaction is limited to simple routine exchanges.
Performs at a level below the Elementary level.	Performs at a level below the Elementary level.	Performs at a level below the Elementary level.

UNIT 1

RUNWAY INCURSION

Section one – Avoiding miscommunication

1 Work in pairs. Discuss the questions below. Ask each other questions to get more details.

1 Have you ever worked with someone whose English you didn't understand?

2 What are some of the causes of miscommunication between controllers and pilots? Note down your ideas.

2 Read the article about a report from a National Aviation Safety Investigation on tower-pilot communications. Check which of your ideas from activity 1 are included.

A recent report showed that miscommunication is a factor in over 70% of operational errors. The report examined four areas of miscommunication:

1 **Requests from the pilot that the controller repeat the instructions**
2 **Misunderstandings by the pilot that result in incorrect readbacks**
3 **Failure of the controller to recognize incorrect readbacks**
4 **Either the controller or the pilot confusing the call sign**

Several factors increased the possibility of communication breakdown. The most important was the complexity of the instructions. The following instruction, for example, when analysed, contains eight separate pieces of information, or eight opportunities for miscommunication:

3890, Ground, give way to the second Dornier inbound, then taxi runway 32 left, intersection departure at Gulf, via outer, Charlie, Gulf.

A lack of fluency in English can cause confusion both because of mispronunciation and misunderstanding. But too much fluency in English can also be a dangerous thing! Any idiomatic language or inappropriate plain English can cause misunderstandings. Also, instructions spoken too quickly can be very difficult to understand.

The report made the following recommendations for further improvements in ATC communications:

- **Keep instructions short**
- **Listen to what a pilot reads back**
- **Speak slowly**
- **When talking to pilots / controllers who don't speak native English, break up the message into its individual words by using short pauses**
- **Ask when not sure about a piece of information**
- **Include the full call sign when giving an instruction or reading back**
- **Wait for complete aircraft identification following instructions**

3 Underline the correct information.

1 In the first incident, the maintenance truck driver *misheard / misunderstood* the controller.
2 In the second incident, the captain *misheard / misunderstood* the controller.
3 In the third incident, *the pilot / the controller / both the pilot and the controller* misunderstood the other person.
4 30% of operational errors *involve / do not involve* miscommunication.
5 The main cause of misunderstanding is instructions that are *unclear / very complicated.*
6 The safest way to communicate is using *simple English / natural, fluent English.*

4 Work in pairs. Discuss the questions.

1 What additional recommendation would you add to the reports?
2 How could each of the three incidents described at the start of the article be avoided?
3 Do you know of any incidents where miscommunication has caused a runway incursion?

Vocabulary – Communication

Try to remember what verbs are used before the following nouns in the article. Then look back at the text to check.

1 m_____ a request
2 r_____ clearance
3 g_____ a response
4 r_____ a message
5 r_____ a mistake
6 r_____ an instruction
7 c_____ a call sign
8 g_____ an instruction

Functional English – Asking for information

1 Use the verbs in the box to complete the questions from an Aviation Authority survey.

does have must do will did are

Survey

1 When _____ you start to learn English?
2 How long _____ you been studying English?
3 How _____ you try to improve your English outside class?
4 What language training _____ you had already?
5 What _____ you find most difficult about English?
6 How often _____ you use English in your work?
7 How much support _____ your employer give you?
8 Why _____ you studying English?
9 What level of English _____ you be happy with?
10 What level of English _____ you have for your job?

2 Work in pairs. Interview each other using the questionnaire.

Speaking – English in aviation

Work in small groups. How far do you agree or disagree with the statements below? Why / Why not?

1 A French ATC speaking to a French pilot at a French airport doesn't need to know English.
2 It's impossible to understand Americans – they don't speak plain English.
3 Pilots have been flying safely for years – they don't need to learn English.
4 R / T phraseology is enough to communicate with.
5 All pilots and ATCs working with international traffic should have ICAO level 5.

Section two – Airport layout

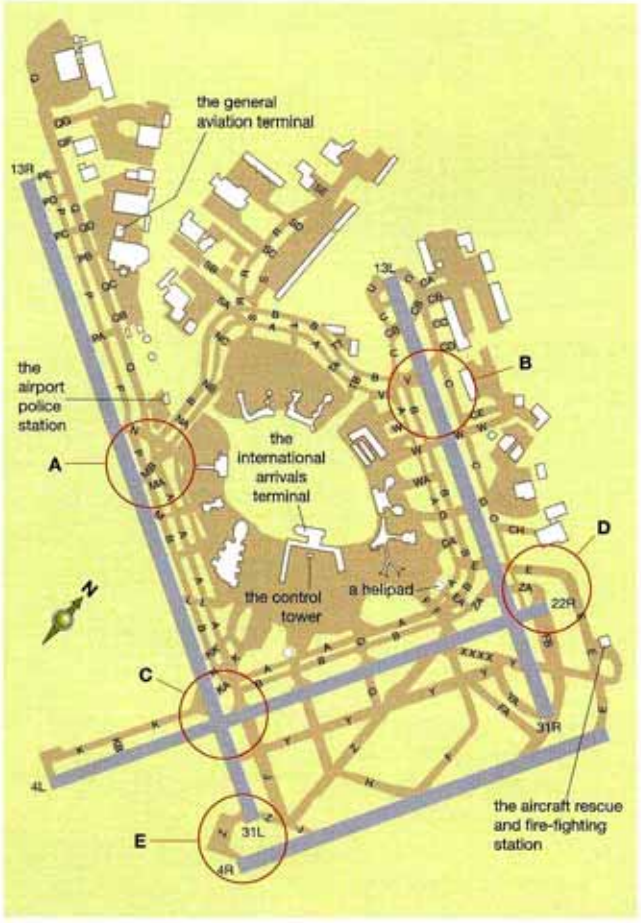
1 Work in pairs. You are going to complete a map of JFK Airport. Student A look at the map on this page. Student B look at the map on p 107. Don't look at each other's maps.

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

- the airport administration offices
- customs offices
- the national weather service
- the postal service offices
- a helipad

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

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



2 01,02,03 Listen to an ATC describing three 'hotspots' at JFK. Which three areas (A–E) on the diagram in 1 does she mention?

1 ___
2 ___
3 ___

3 01,02,03 Listen again and match each problem with one of the areas in activity 2.

1 Outbound aircraft can easily cross a runway if they miss the taxiway. ___
2 You can't see the runway you are taxiing to. ___
3 Inbound traffic must turn right to avoid conflict. ___
4 You can have a long taxi if you turn left too soon. ___
5 You can easily follow the wrong line. ___

4 Describe an airport you know, including the taxi circuits for arriving and departing traffic. Are there any hotspots?

Pronunciation – The ICAO alphabet

1 04 Listen and write the letters in the correct column in the table according to their stress pattern. The first one has been done for you.

Q R Z N H J S A

oO	Oo	Ooo	oOo
Q			

2 04 Listen again and repeat.

3 Work in pairs. Add the missing letters of the ICAO alphabet to the table.

4 Spell the following items for your partner to write down.

- the town where you were born
- your full name
- your address

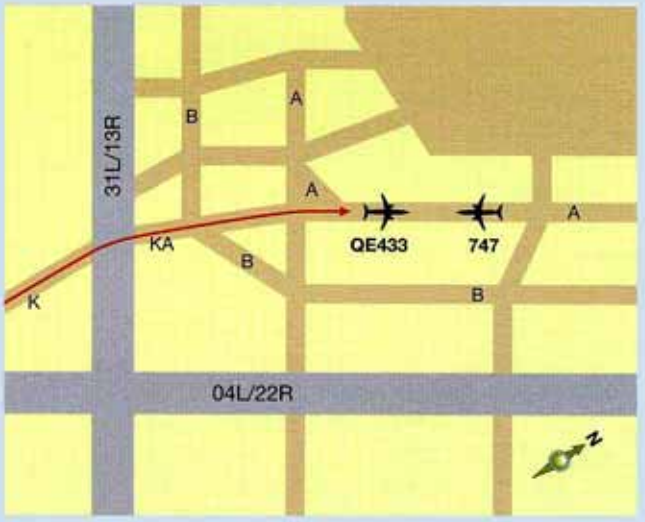
Vocabulary – Prepositions

Below is a controller's report of an incident in area C of the aerodrome.
Complete the report with the missing prepositions.

to at ahead on towards into onto across from via along

Controller's report

QE433 landed (1) _____ runway 22R in marginal weather conditions. The crew were issued instructions to taxi (2) _____ the runway (3) _____ the apron on K and B (4) _____ KA. They taxied (5) _____ K, but missed the sign and the runway holding position markings for 13R, and went (6) _____ the active runway and (7) _____ KA on the opposite side. At the same time, a 747 was taxiing (8) _____ position on runway 13R. (9) _____ the intersection with B, the crew missed the arrow pointing right. It continued straight (10) _____ and taxied (11) _____ the terminal on A. QE433 finally came nose-to-nose with the outbound 747.



Speaking – Sketching out an airport

1 Work in pairs. Look at the aerodrome information. Design an aerodrome layout including runway and taxiway configuration and the taxi circuit. Mark these positions on your diagram:

- Where ATC issue runway-in-use information and taxi clearances
- The holding position(s) in case of traffic conflict
- Where ATC issue take-off clearance
- Where ATC issue clearance to taxi to apron
- Where ATC issue parking information

2 Compare your ideas with another pair.

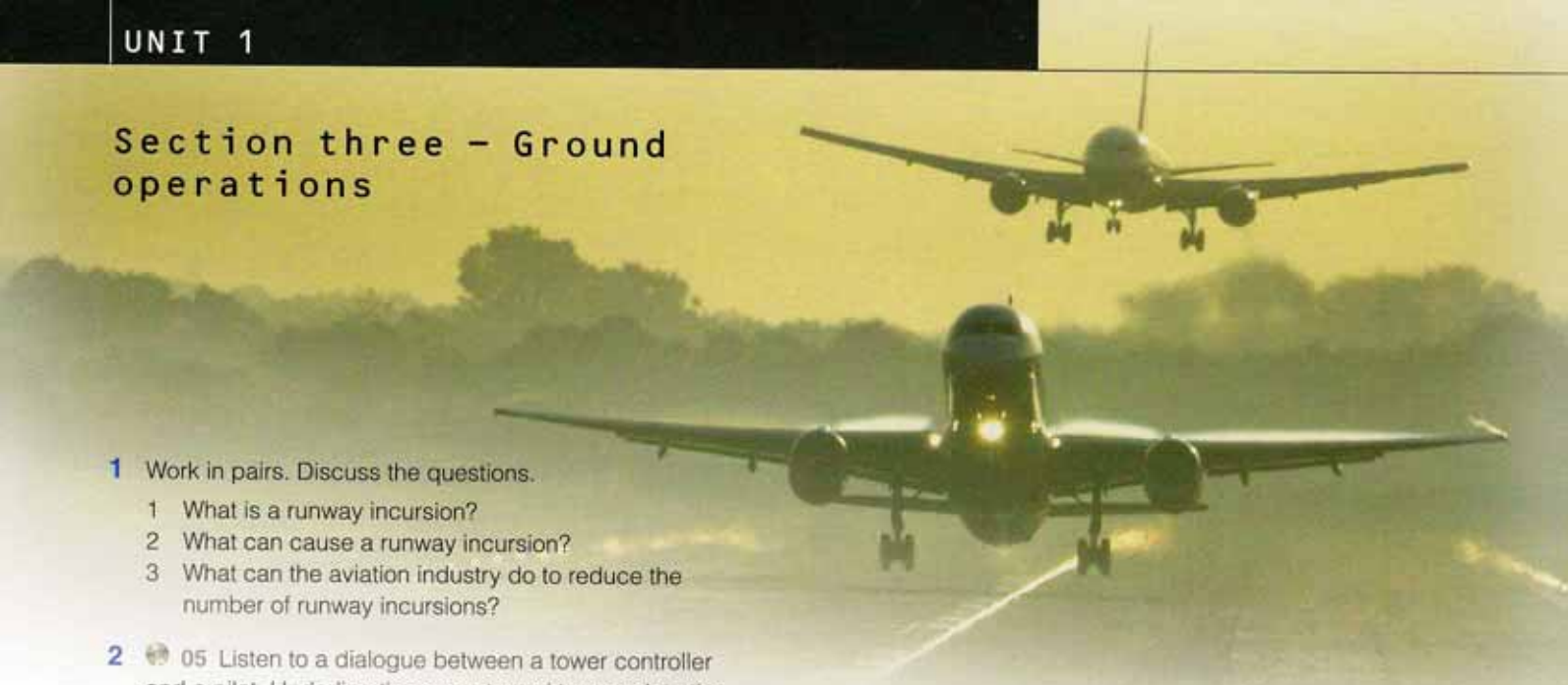
Aerodrome data

Prevailing wind: 230°

Type of traffic: IFR/VFR, private, scheduled, domestic and international

Average daily traffic movements: 1,100

Section three – Ground operations



1 Work in pairs. Discuss the questions.

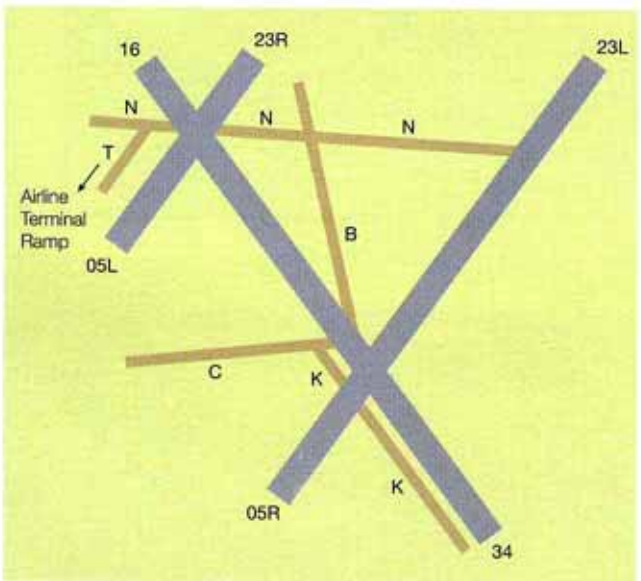
1 What is a runway incursion?
2 What can cause a runway incursion?
3 What can the aviation industry do to reduce the number of runway incursions?

2 05 Listen to a dialogue between a tower controller and a pilot. Underline the correct word to complete the summary of the incident.

In *marginal / good* weather conditions, an *inbound / outbound* aircraft takes the incorrect taxiway and moves onto an *active / inactive* runway. Another aircraft *lands / takes off* in front of the aircraft. The tower controller tells the crew to *turn left / stop*. In the end the plane *follows / clears* the runway.

3 05 Listen again and mark on the diagram:

1 The route the tower controller expects the plane to take.
2 The route the plane actually takes.
3 The position where the plane stops to wait for further instructions.
4 The position where the tower thinks the plane has stopped to wait for further instructions.



Pronunciation – Numbers

1 06 Listen to the call signs. Correct any mistakes.

1 FR~~369~~ 396
2 AQ692
3 CZ310
4 LN488
5 HY557
6 JM402

2 Work in pairs. Practise saying call signs.
Student A, go to p 104. Student B, go to p 107.

Vocabulary – Verbs describing actions and position

Put these ground manoeuvres in the correct column according to their speed in routine operations.

~~stand~~ ~~move around~~ approach turn push back head wait roll for take-off taxi queue touch down exit face

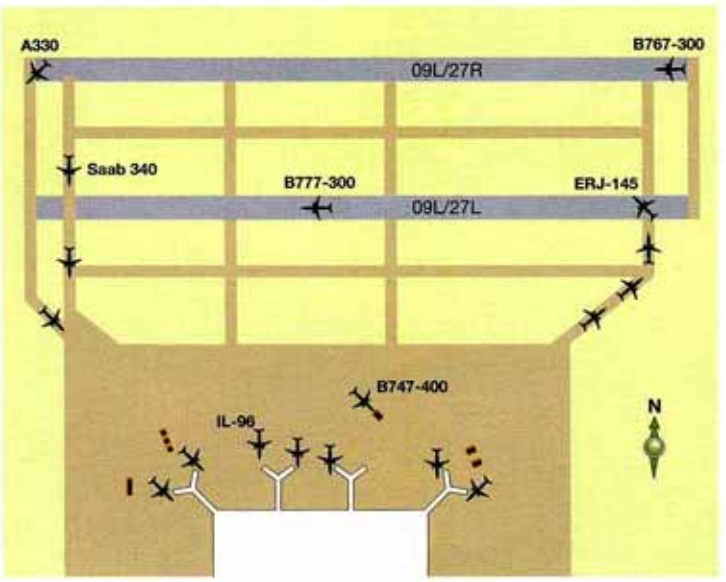
no movement	slow	fast
stand	move around	

Functional English – Describing actions and position

Look at these extracts from the dialogue.

*I'**m** fac**ing** Kilo.*
*We **are** approach**ing** Charlie on Kilo.*
***There's** somebody tak**ing** off!*
***There** are signs show**ing** the runways.*

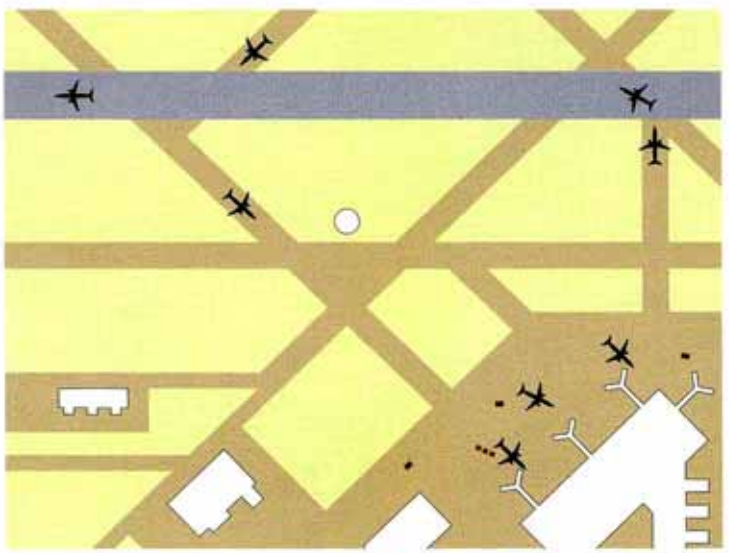
Complete the description of the picture with the verbs from the Vocabulary section in the correct form.



1 *There's* a 767-300 *touching down* on runway 27R.
2 An A330 *is turning* left.
3 It _____ the far end of the same runway.
4 _____ two aircraft _____ towards the apron.
5 A Saab 340 _____ south. It _____ to cross runway 27L.
6 On runway 27L a B777-300 _____ for take-off.
7 An Embraer ERJ-145 _____ into position.
8 After the Embraer, _____ three more aircraft _____ to depart on runway 27L.
9 A few service vehicles _____ around on the apron.
10 Seven aircraft _____ at the gates.
11 A truck _____ a 747-400.
12 An IL-96 _____ its gate.

Speaking

1 Work in pairs to complete your pictures of an airfield. Student A look at this page. Student B go to p 107.



2 Work in pairs. Discuss the questions.

1 What factors increase the possibility of hotspots?
2 What can be done to reduce hotspots?
3 Are hotspots becoming more or less of a problem?
4 Which airports have the most / fewest hotspots?

Section four – Language development

Functional English – Question forms

1 Rearrange the words to make questions.

1 you / aviation / start / career / your / when / did / in?

2 of / aspect / your / do / most / you / job / enjoy / what?

3 have / which / worked / you / at / airports?

4 hours / week / average / how / on / work / many / a / you / usually / do?

5 you / did / problem / in / experience / when / last / English / communication / a?

6 how / to / do / training / often / have / you / attend / courses?

7 language / much / will / training / have / you / year / this / how?

8 long / did / how / to / your / do / job / train / you?

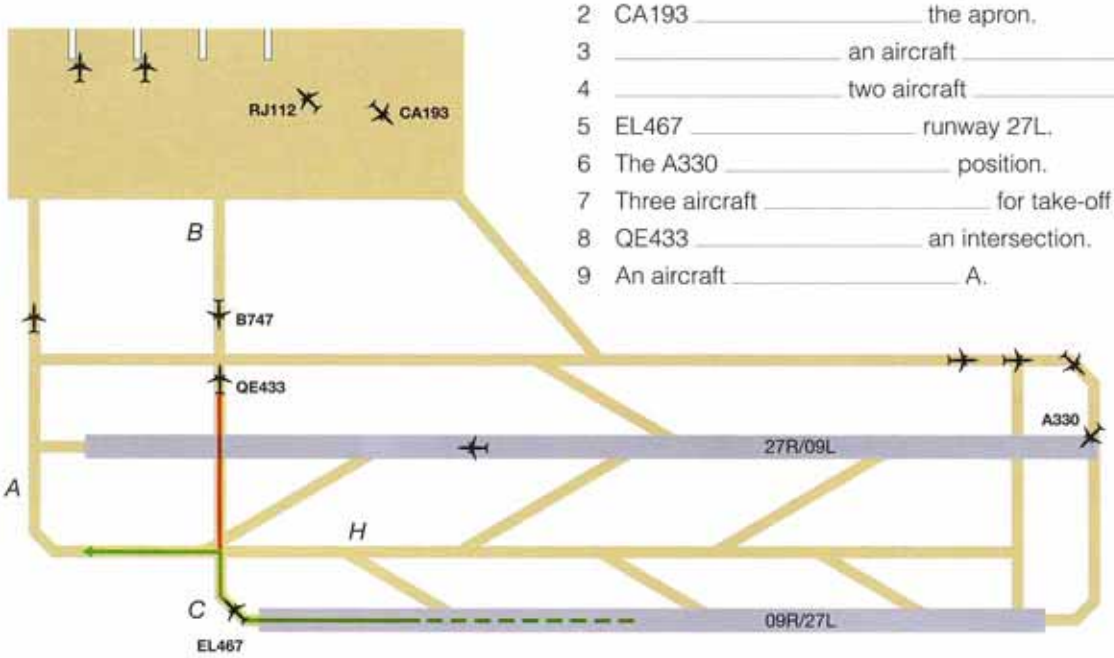
2 Answer the questions using full sentences.

Example

I started my career in aviation five years ago.

Describing actions and position

3 Look at the diagram and complete the description of what the planes mentioned are doing.



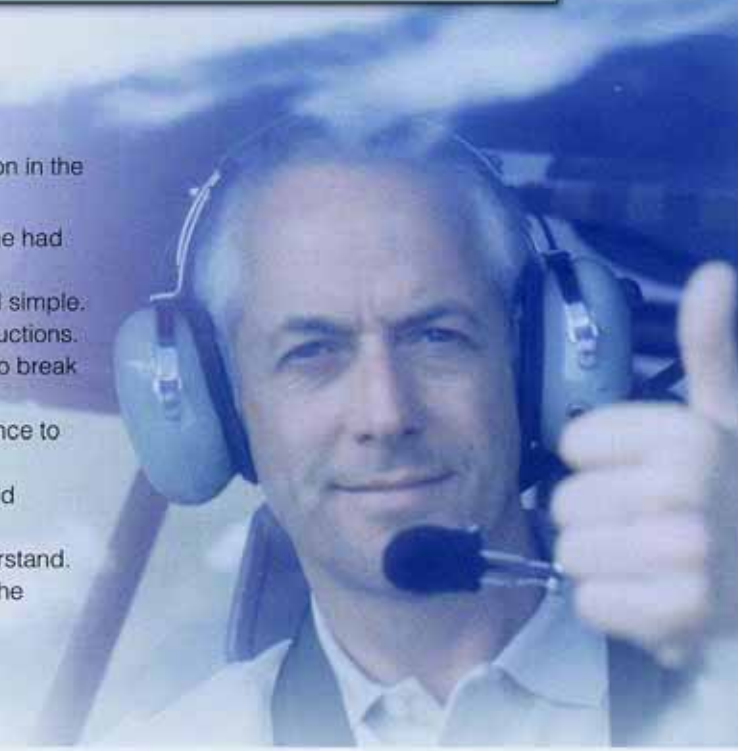
1 RJ112 _____ its gate.
2 CA193 _____ the apron.
3 _____ an aircraft _____ on runway 27R.
4 _____ two aircraft _____ at the gates.
5 EL467 _____ runway 27L.
6 The A330 _____ position.
7 Three aircraft _____ for take-off on runway 27R.
8 QE433 _____ an intersection.
9 An aircraft _____ A.

4 Read this report of the incident shown in 3. Complete it with the words from the box.

came nose-to-nose	continued straight ahead	taxied along	landed on	taxi from
carried on towards	taxiing into	went across		

Incident report

QE433 (1) _____ runway 27L in fog. The tower issued instructions to (2) _____ the runway to the apron on C and A via H. It (3) _____ C, but at the intersection with H, the crew missed the arrow pointing left, and (4) _____. They then missed the sign for runway 09L, and (5) _____ the active runway and onto B on the opposite side. At the same time, an A330 was (6) _____ position on runway 27R. QE433 (7) _____ the terminal and (8) _____ with an outbound 747 on B.



Vocabulary – Communication

1 Complete each sentence with a verb related to communication in the correct form.

1 When the pilot r_____ the instruction, I realized that he had m_____ me.
2 Controllers should k_____ their instructions short and simple.
3 Hold short of the runway and w_____ for further instructions.
4 Pilots can m_____ complex instructions, so it's best to break them up.
5 The truck driver thought the tower had i_____ clearance to cross the runway.
6 When r_____ to an ATC traffic call-out, the pilot should i_____ his call sign.
7 If a controller m_____ a word, the pilot may not understand.
8 If a pilot g_____ an incorrect readback, r_____ the instruction.

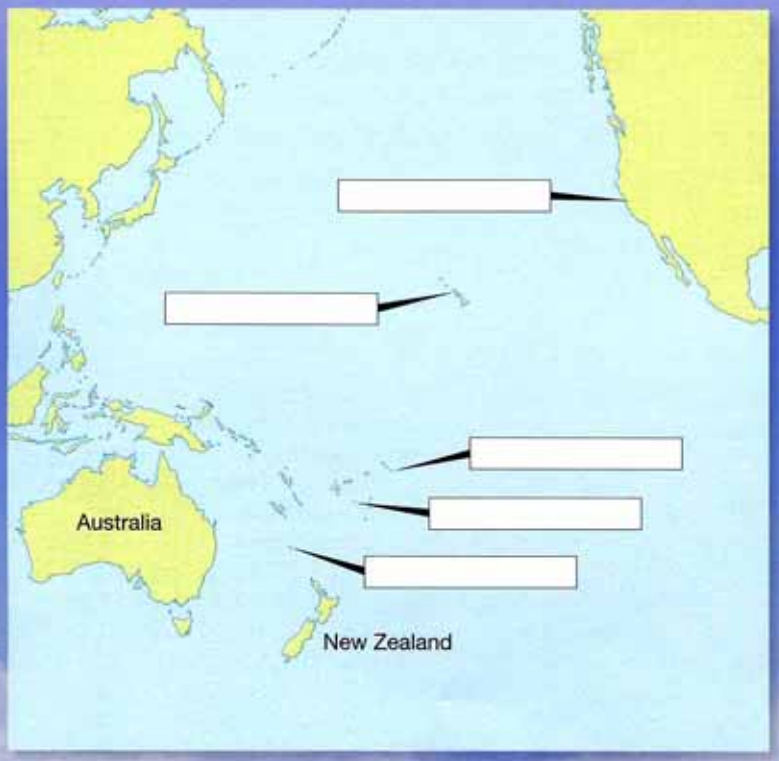
Parts of an airport

2 Rearrange these letters to make features of an airport.

1	**tootpsh**	a point in an airport where there is danger of runway incursions	_____
2	**awaxity**	a road that planes take to get to and from the runway	_____
3	**worar**	a symbol that shows you which way to go	_____
4	**stabl cenef**	a barrier that protects an area from the force of jet engines	_____
5	**naggise**	letters, numbers and symbols that are positioned around an airport to show pilots where they are and which way to go	_____
6	**menavept krimsang**	lines and letters painted on the ground	_____
7	**nittercoseni**	a place where two runways, roads, etc. cross	_____
8	**altremin**	the main building at an airport	_____

LOST

Section one – Across the Pacific



1 Work in pairs. Look at the map and photograph. What particular problems could a pilot of this type of aircraft have on a long flight across an ocean?

2 Match the words below with the definitions a–f.

calculate track fix endurance chart compass destination en route

a the longest time an aircraft is able to fly without stopping _____
b a map used for planning and marking a route _____
c on the way; on the line that your journey follows _____
d a piece of equipment that shows your direction _____
e the line on a map that an aircraft follows _____
f the place you are travelling to _____
g a position in space, usually on a flight plan _____
h to use mathematics to find out something _____

3 Read the text about the flight on the opposite page. Label the pilot's route on the map.

4 Complete the pilot's flight plan.

5 Read the text again and answer the questions.

1 Who did the pilot work for?
2 What navigational equipment did he have on board?
3 Why did he leave Pago Pago at 0300?
4 Why did he fly on his compass from Ono-I-Lau to Norfolk Island?
5 When did the pilot realize there was a problem?

Flight plan

AIRCRAFT	(1) _____
FLIGHT ORIGIN	Oakland, California
FLIGHT DESTINATION	Australia
PERSONS ON BOARD	1
ENDURANCE	(2) _____
ESTIMATED FLIGHT TIME	(3) _____
CRUISING SPEED	(4) _____
TIME OF DEPARTURE FROM PAGO PAGO	(5) _____
DISTANCE TO NORFOLK ISLAND	(6) _____

Solo flight to Norfolk Island

In 1978, pilot Jay E. Prochnow was working for an aircraft sales company in Oakland, California. An experienced civil and military pilot, Prochnow was given the task of delivering a Cessna 188 single-handed from Oakland, to Australia. Because the flight covered thousands of miles over open ocean, the aircraft was fitted with extra fuel tanks for the journey. Apart from charts and a compass, the only navigation equipment he had was an ADF for picking up the HF signals of NDBs scattered across the tiny islands of the Pacific Ocean. At the time, this crossing was a long trip even for big jets. For a single-engine aircraft with one crew, this was a long and dangerous mission.

After a stopover in Hawaii, he completed the second leg of the journey on schedule, and arrived on the Samoan island of Pago Pago without incident. The pilot rested for one day before he began the third leg of the trip, and he spent his time on the island preparing for the long and tiring flight ahead. The charts showed a distance of almost 1,500 nm to Norfolk Island. Prochnow calculated a flying time of 15 hours minimum, cruising at 110 kt in good VFR conditions with a light wind. He decided to carry maximum fuel and he filled the tanks to give a total endurance of 22 hours.

He planned his flight well. He departed Pago Pago at 0300, and with 15 hours of daylight in front of him, he could make visual contact with the fixes and his destination below him.

Using the NDBs, Prochnow navigated successfully to the fix of the island of Ono-I-Lau, almost directly en route. Now his task was to fly the remaining 850 nm of empty ocean to Norfolk Island with no navigation aids at all. Now he flew by compass alone. A few hours later he came into range of the Norfolk NDB, and he followed the heading indicated by the ADF. As he approached the ETA he looked carefully for the island, but it wasn't in sight.

6 Work in pairs. What tips can you think of for pilots planning to fly long-distance in a light aircraft? Make a list. Then compare with the other pairs.

Functional English – Explaining abbreviations

1 Here are some common expressions for asking or saying what abbreviations mean. Do you know what these abbreviations stand for?

*What does NDB **stand for**?* *It **stands for*** _____ – _____.
*What does ADF **mean**?* *It **means*** _____.
*What **is** VFR **short for**?* *It's **short for*** _____.

2 Work in pairs. You are going to practise saying and explaining abbreviations. Student A go to p 104. Student B go to p 107.

Section two – Finding Flight N45AC

1 Look at the pictures of what happened next in the Prochnow story. Put them in the correct order.

1___ 2___ 3___ 4___ 5___

2 07,08,09 Listen and check your answers.

3 07,08,09 Listen again and circle the correct answer.

1 Prochnow contacted
   a other aircraft in the area
   b Auckland ATC for help.

2 A commercial jet made
   a radio contact
   b visual contact.

3 Both aircraft flew towards the sun to establish their
   a heading
   b position.

4 Captain Vette tried to establish Prochnow's exact position using Prochnow's
   a radio signal
   b transponder.

5 They established the co-ordinates for
   a Prochnow
   b Norfolk Island.

Vocabulary – Co-ordinates

1 Listen again and complete the co-ordinates.

08

Vette Turn towards the sun and report your heading.

Prochnow Wilco. My heading is (1) _____ .

09

Vette N45AC. Sunset on Norfolk Island is 0730 zulu. That means you are (2) _____ and (3) _____ of Norfolk Island.

Vette Your co-ordinates are (4) _____ . You are (5) _____ from Norfolk Island.

2 10 Listen and repeat these directions and co-ordinates.

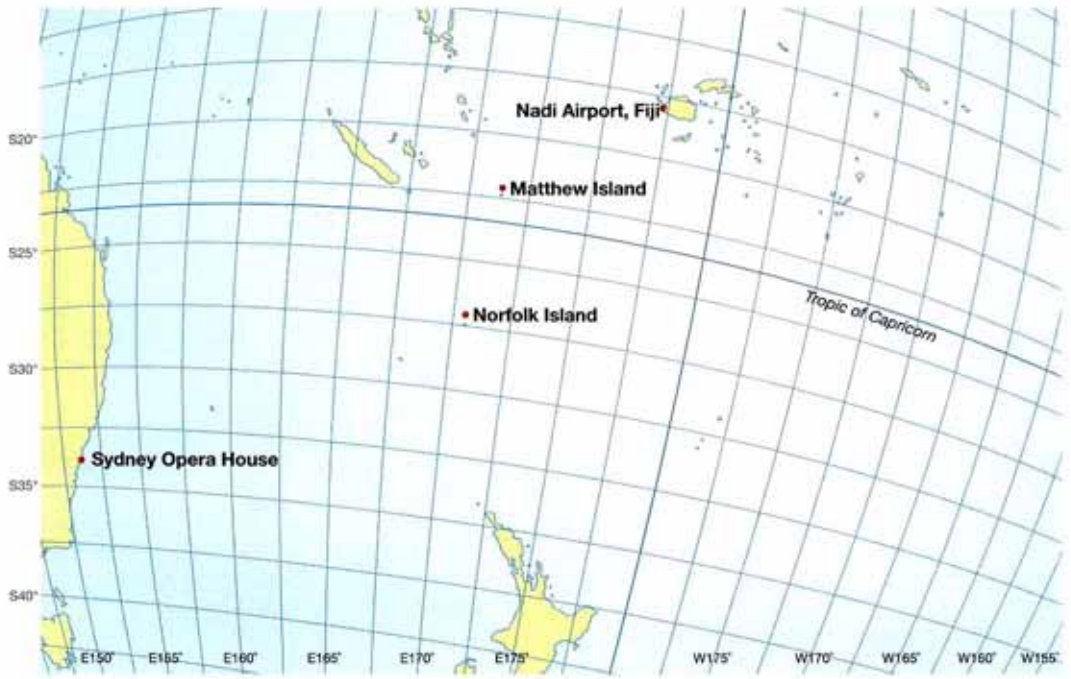
north south east west south-east north-west south-west north-east
274° 56°E 30°S 170° 21'E 14°32'40.25"N

3 Work in pairs. Student A look at the next page, Student B look at p 108.

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

1	31°03'44.28"S,	170° 21'07"E	3	20 38'59.26"S	178°42'00.04"E
2	14°16'02.16"S	170°42'.39.81"E	4	36°55'23.43"S	174°45'16.22"E

Example
What do you have at three-one degrees, three minutes, four-four decimal two-eight seconds south, one-seven-zero degrees, two-one minutes, seven seconds east?



Pronunciation – Regular past tense endings

1 11 Regular verbs in the past tense have three different sounds at the end of the verb. Listen and notice the verb endings.

/d/ *We receiv**ed** news of your situation.*
/t/ *The ADF stopp**ed** working correctly.*
/ɪd/ *I want**ed** to have enough light to see my fixes.*

2 Put the verbs into groups according to the sound of their ending.

contacted departed established tried calculated followed tasked arrived approached

1 /d/ _____ _____ _____
2 /t/ _____ _____ _____
3 /ɪd/ _____ _____ _____

3 12 Now listen and repeat.

4 Work in pairs. Use words on the right to help you tell the story of Prochnow's flight. Student A, tell the first part of the story. Student B, tell the second part of the story. Use the past tense.

Student A

1 Prochnow / leave / Pago Pago / 3.00 a.m.
2 decide / carry / maximum fuel
3 fill / tanks / endurance / 22 hours
4 en route / ADF / stop working
5 Cessna / fly / off course
6 Prochnow / call Mayday / Auckland ATC

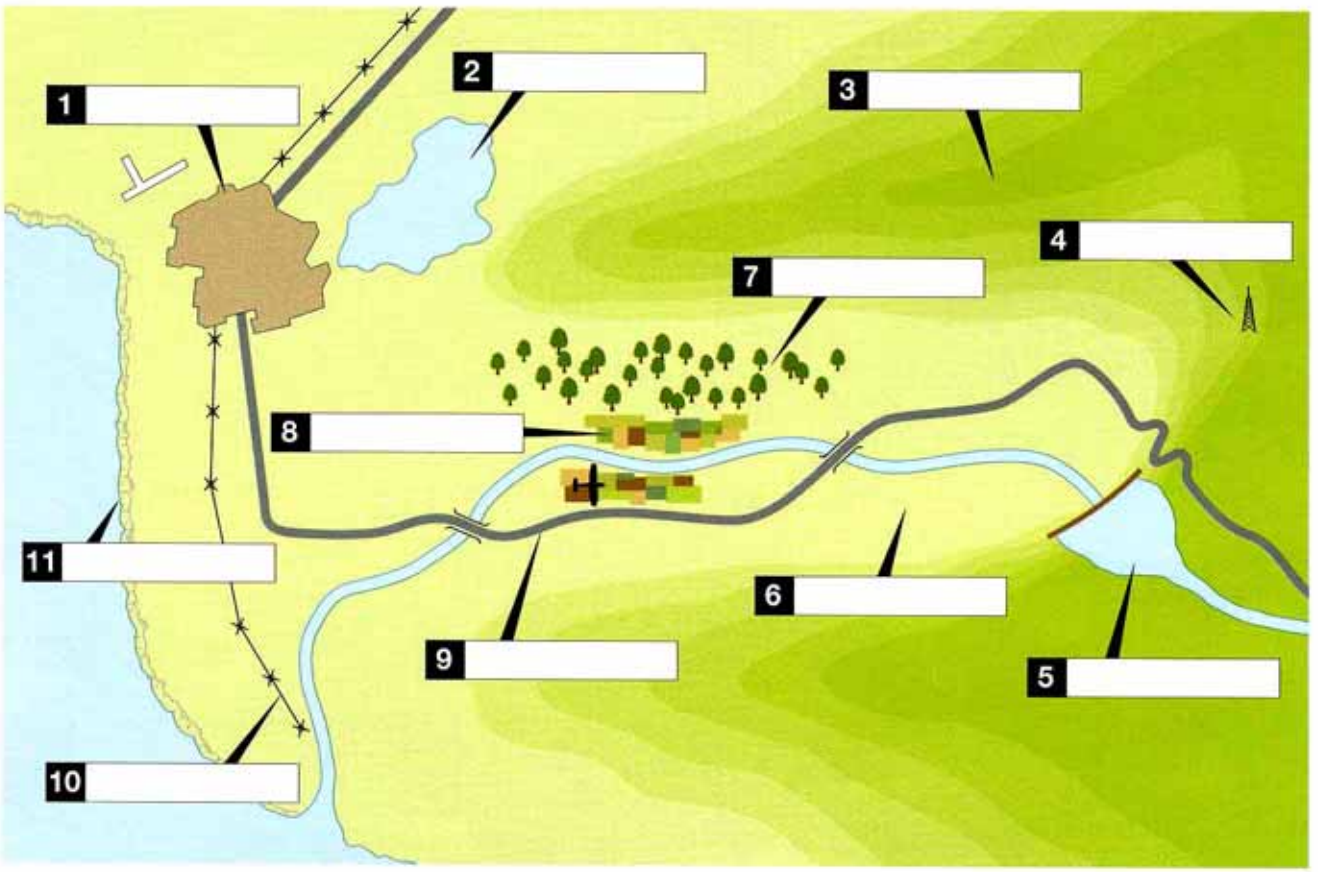
Prochnow left Pago Pago at 3 a.m. He decided …

Student B

1 Captain Vette / answer / Mayday call
2 divert plane / Prochnow's location
3 tell Prochnow / fly / sun / establish / position
4 fly around / Cessna / find / Prochnow / using radio signal
5 direct Prochnow / fly east / Norfolk Island
6 Prochnow see / oil rig / Vette guide / to Norfolk Island

Captain Vette answered a Mayday call. He diverted …

Section three – Lost



1 Match the features in the box to labels 1–11 on the map.

woods	highway	mast	coast	power lines	lake	valley	built-up area	reservoir	high ground	fields

2 13 Listen to the first part of a dialogue between a lost pilot and a controller. Complete the location report.

Location report

Call sign	TJB
Last known position	(1) _____ miles (2) _____ of CELRA VOR
Aircraft	(3) _____
Altitude	(4) _____
Speed	(5) _____ kt
Fuel	(6) _____ lb
Persons on board	(7) _____
Endurance	(8) _____ hours _____

3 14 Look at the map above of the plane's position. Listen to the next part of the conversation and tick (✔) the features in exercise 1 that they describe.

4 14 Listen again and draw the pilot's track on the map.

Functional English – Confirming and disconfirming

1 14 Listen to the dialogue again and complete the sentences below. They all ask for or give confirmation or disconfirmation.

1 _____ you fly into VFR? ✓
2 _____ that you can see a road. ☐
3 _____ you make out a river? ☐
4 _____ the river on the north side of the road? ☐
5 _____ that the road crossed the river…? ☐
6 _____ a communications mast at 12 o'clock, at about four miles? ☐

2 14 Listen again. Tick (✔) where the pilot gives confirmation. Cross (✘) where the pilot disconfirms.

3 14 Discuss with a partner which sentence you think is spoken more clearly, (1) or (2).Then listen again to the start of the recording and check if you were right. Discuss the reason for this.

Controller TJB. *Can you fly into VFR?* (1)

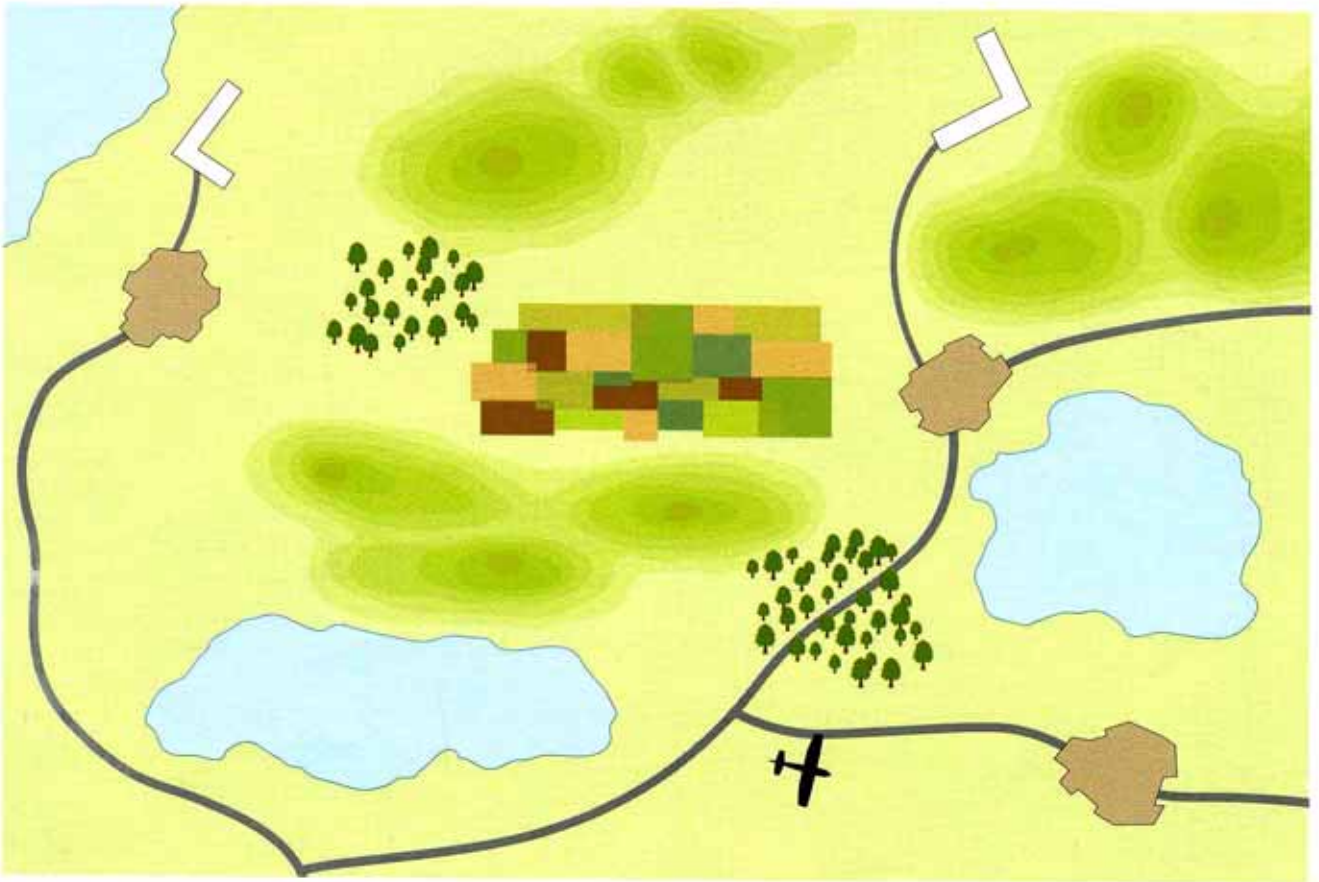
Pilot Affirm … I can see high ground to the north. I'm flying up a valley, with woods to the north, and fields below me. There is a road below me.

Controller TJB. *Confirm that you can see a road.* (2)

Pilot Affirm. I can see a road.

Speaking

Work in pairs. Student B, turn to p 108. Student A, you are a pilot who is lost and low on fuel. Look at this page. Describe your position to Student B – the ATC – who will direct you to the nearest airstrip using visual fixes. Use the phrases from 1 for confirming and disconfirming.



Section four – Language development

Functional English – Simple past

1 Complete the text with the past simple form of the verb in brackets.

A plane carrying 20 passengers heading for Busan (1) _____ (make) an emergency landing yesterday. The emergency (2) _____ (happen) after the pilot (3) _____ (report) a technical problem. The flight (4) _____ (depart) Seoul at 0700 and (5) _____ (fly) towards Busan. The flight (6) _____ (not reach) Busan, but (7) _____ (land) in Daegu shortly after 0800. The pilots (8) _____ (believe) there (9) _____ (be) a fire. The passengers (10) _____ (not be) hurt.

2 Complete the conversation with questions.

Journalist (1) _____ (you / make) an emergency landing?
Captain Because we thought we could smell smoke on the flight deck.
Journalist (2) _____ (you / notice) the problem?
Captain About 40 minutes after we left Seoul.
Journalist (3) _____ (you / decide) to land immediately?
Captain Yes, of course.
Journalist (4) _____ (you / land) at Daegu?
Captain We descended to Daegu because it was our closest airfield.
Journalist (5) _____ (the fire / start)?
Captain We're not really sure – perhaps it was an electrical fault.
Journalist (6) _____ (you / have) on board?
Captain We had 18 passengers with us.

3 Complete this newspaper report using the verbs in the box in the past simple tense.

avoid | be (x2) | blame | cross | detect | happen | issue | not tell | steer | take place

Two planes were less than a mile away from a major catastrophe when a near-collision (1) _____ in thick clouds above London.

A Boeing 747 and a Gulfstream jet only (2) _____ each other when their internal warning systems (3) _____ human error and automatically (4) _____ away from danger.

The Boeing 747 (5) _____ heading towards Heathrow Airport from Japan and the business jet (6) _____ en route from Sardinia to Luton Airport when their paths (7) _____ over London.

The incident (8) _____ in July last year near to Southam, and the Air Accident Investigation Branch today (9) _____ its report into the incident.

It (10) _____ the pilot of the Boeing 747, who was flying "too fast" as the plane began its landing procedures and (11) _____ Air Traffic Control of his speed.

Confirming and disconfirming

4 Complete the dialogue with the words in the box.

affirm | can see | confirm that | give further | negative | say last | that correct | what you

Pilot MAYDAY. MAYDAY. MAYDAY. Tibruk Centre, IG21. We're lost.

ATC IG21 Tibruk Centre. Roger emergency. (1) _____ known position.

Pilot Last known position was 10 miles north of Tibruk.

ATC IG21. Last known position was 10 miles north of Tibruk. Is (2) _____ ?

Pilot (3) _____ . Last known position was 10 miles north of Tibruk.

ATC IG21. Please tell me (4) _____ see now.

Pilot I (5) _____ a communications mast directly west and a lake below me.

ATC IG21. (6) _____ you can see a communications mast to the east.

Pilot (7) _____ . The communications mast is to my west.

ATC IG21. Turn left 45° and head west to the communications mast.
We'll pick you up on radar from there and (8) _____ instructions.

Vocabulary

1 Match these verb and noun combinations from the text ***Lost***. Then check in the text.

1	cover	a	by compass
2	complete	b	the second leg
3	cruise	c	a heading
4	make	d	thousands of miles
5	navigate	e	into range of an NDB
6	fly	f	the ETA
7	come	g	at 110 kt
8	follow	h	to a fix
9	approach	i	visual contact with a fix

2 Work in pairs. Try to remember the missing verbs spoken by Captain Vette.

N45AC. (1) M_____ your position, so we can (2) e_____ your position using the radio signal. We'll (3) m_____ our heading until we (4) l_____ contact. Then we will (5) t_____ left to (6) r_____ contact, and then try to (7) b_____ you in this way. We'll (8) c_____ you again very soon. N45AC. It's (9) g_____ dark. What time is your sunset?

3 Write the words below in the appropriate category. Use your dictionary to help you.

bridge | desert | footpath | cemetery | farmland | high terrain | lighthouse | harbour | marshland | plain | ridge | urban area

type of land	feature

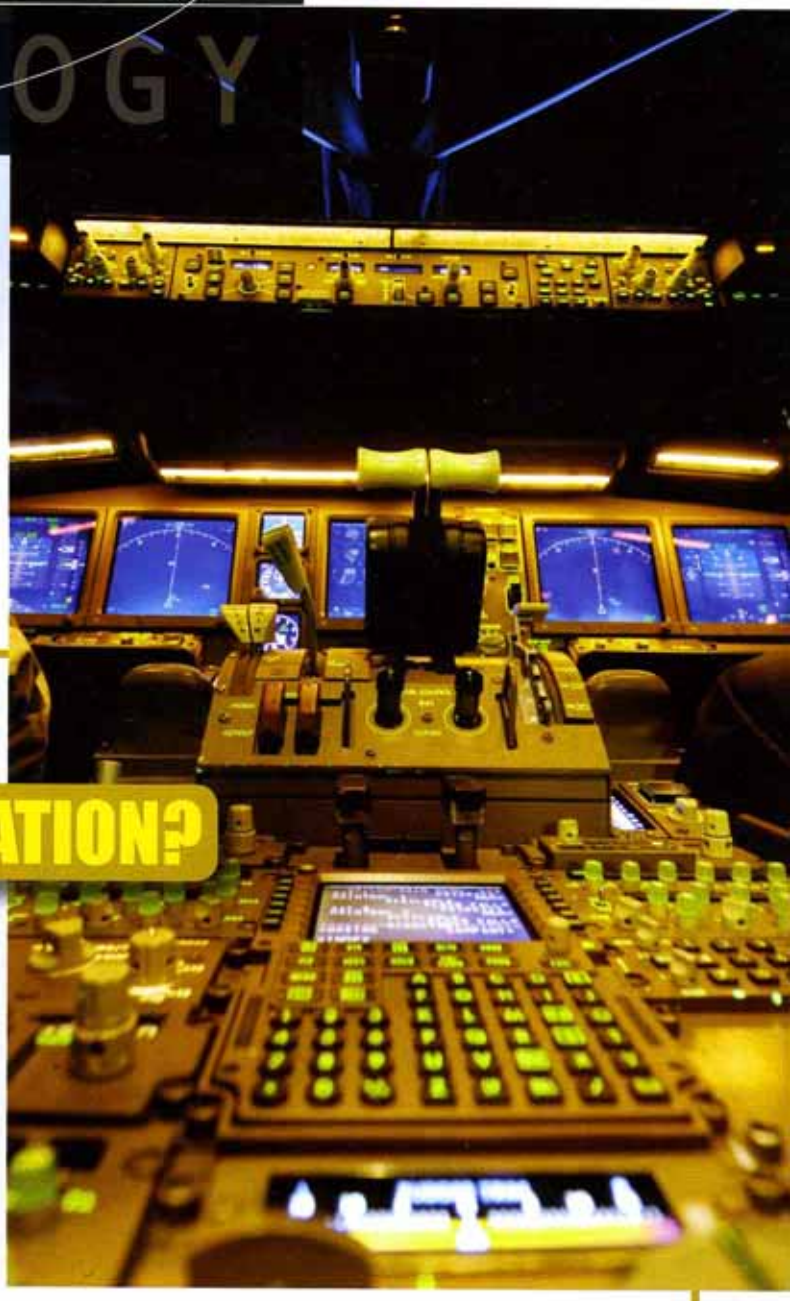
TECHNOLOGY

Section one – Datalink

1 Look at the pictures of Datalink communication system. Tell the group what you know about this technology.

2 Work in pairs. Before you read the article, note down advantages and disadvantages of using text rather than voice communication.

3 Read the text. Tick (✔) your ideas that are mentioned.



IS THIS THE END FOR VOICE COMMUNICATION?

Datalink allows routine air traffic instructions and requests to be sent as text messages instead of via traditional voice communications. The pilot uses Datalink for requesting changes of level or speed, while the controller uses it to give **clearance** for level or speed changes and **frequency** changes. Controllers also use it in order to manage a larger number of aircraft – some claim it could eventually increase **capacity** by 40%.

Clear traffic instructions sent in a pre-formatted text message avoid the need for repetition, and reduce communication errors such as simultaneous **transmissions** and misheard instructions and requests. The messages are delivered in near-real time, and with higher reliability than voice transmissions. Datalink has reduced airspace **congestion**, and many people think it has helped to make communications fast and safe.

However, Datalink also has its drawbacks. It allows 'free text' messages, so that the crew can use their own words to deal with non-routine events. However, even when the pilot writes the message carefully, controllers sometimes do not understand the message, as they may not use the same words and abbreviations, especially when they do not speak the same language. Using text also increases the crew's workload – in an emergency situation, they cannot afford the **heads-down time** required to read and write messages. Another drawback is that when Datalink messages get out of **sequence**, pilots do not have the time to match messages to responses. Finally, in a mixed voice-data **environment**, the crew's attention is divided, making it easier to miss a voice call.

There can be no doubt that Datalink has an important place in the future of civil aviation communications. But when we need to communicate beyond simple routine messages – for example, in an emergency – there is no substitute for talking.

4 Read the text again and decide if the sentences are true or false. Write *T* or *F*.

1 Datalink reduces voice communication by 40%. ____
2 The pilot receives a text message almost immediately. ____
3 Datalink allows you to write your own messages when necessary. ____
4 Datalink messages don't use abbreviations. ____
5 It is possible to communicate by voice and text at the same time. ____
6 The writer doesn't believe that Datalink should completely replace voice communication. ____

5 Work in pairs. Discuss the question.

If you had the choice whether or not to use Datalink in your job, what would you decide? Why?

Vocabulary – Communications

Find bold words in the text that match the definitions.

1 spoken messages sent over the radio _____
2 a situation where too many people are using a system _____
3 the wavelength that is used for radio communication _____
4 a place that uses a particular type of system _____
5 official permission to do something _____
6 the correct order _____
7 the maximum that a person or system can deal with _____
8 time spent reading or writing _____

Functional English – Expressing purpose

1 Look back at the text to complete the sentences.

1 The pilot uses Datalink _____ requesting changes of level or speed ...
2 ... the controller uses it _____ give clearance for level or speed changes and frequency changes.
3 Controllers also use it _____ manage a larger number of aircraft.
4 It allows 'free text' messages, _____ the crew can use their own words to deal with non-routine events.

2 Complete the sentences using the words and phrases from 1. Note that either *to* or *in order* to can be used in some sentences.

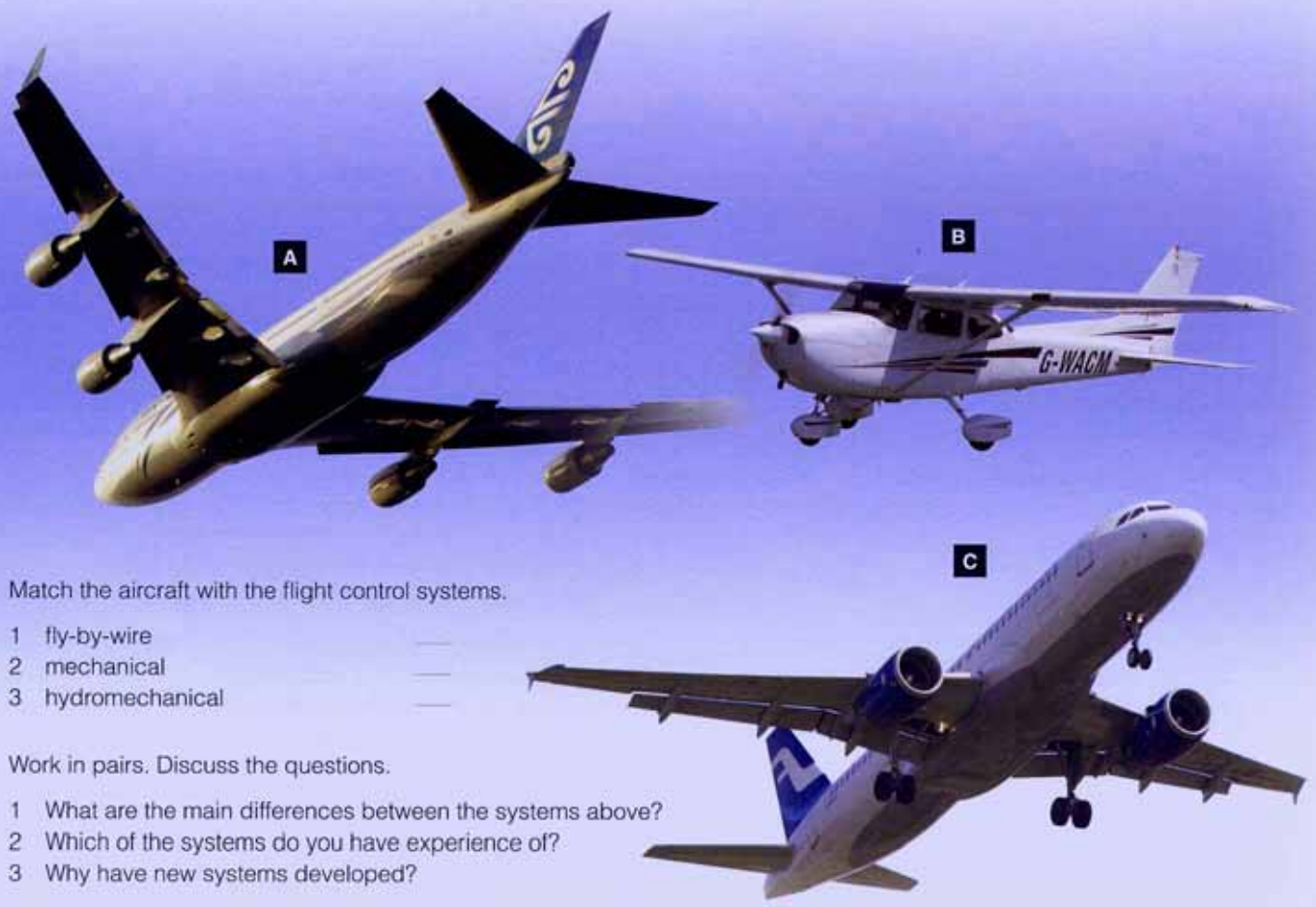
1 Commercial aircraft carry a CVR _____ recording communications in the cockpit.
2 Large aircraft are equipped with TCAS _____ reduce the danger of mid-air collisions.
3 Flight schools use simulators _____ pilots can learn to fly in safe conditions.
4 The sterile cockpit rule was introduced _____ make sure flight crew keep their concentration during take-off and landing.
5 Many pilots prefer to use the EFB rather than paper _____ performing flight management tasks.
6 Crash investigators rely on the FDR _____ analyze an aircraft's behaviour before the accident.
7 One part of a glass cockpit display is used for EICAS, _____ the crew can keep a constant eye on what the engines are doing.
8 The head-up display was developed _____ allow pilots to read important data without having to look down.

Speaking – The perfect technology

Work in pairs. Imagine a piece of future technology that solves most of the present problems of pilot-ATC communication. Note down your ideas then describe the technology to the class. Think about:

- what it does
- how it is used
- why it improves safety
- how it makes users' work easier.

Section two – Flight control systems



1 Match the aircraft with the flight control systems.

1 fly-by-wire ___
2 mechanical ___
3 hydromechanical ___

2 Work in pairs. Discuss the questions.

1 What are the main differences between the systems above?
2 Which of the systems do you have experience of?
3 Why have new systems developed?

3 Complete the sentences with the words below.

override ultimate control capability built-in limits

1 If a pilot has _____, then he takes the final decision on controlling the aircraft.
2 When the flight control system is completely automatic, the pilot's _____ is reduced.
3 The points that a pilot cannot go past which are part of the flight control system are called _____.
4 To cancel or change an automatic action, we use the _____ function.

4 15 Listen to a discussion between an airline employee and pilot, and answer the questions.

1 Why does Jean want Mehmet's opinion about two planes?
2 What two aircraft are they talking about?
3 Why does Mehmet mention Habsheim and Colombia?
4 Which plane does Mehmet think is safer?

5 15 Listen again and underline the correct information.

1 Both aircraft use *mechanical / fly-by-wire / intelligent* flight control systems.
2 The Airbus gives final control to the *flight control system / pilot / first officer.*
3 At the Habsheim airshow, the computer didn't allow the pilot to *pull up / land correctly / retract the air brakes.*
4 In Columbia, a computer could have stopped the pilot *flying too quickly / keeping the speed brakes on / climbing.*

Functional English – Saying things another way

1 15 Listen again and complete these sentences from the conversation.

1 Sorry Mehmet – can you just _____ 'fly-by-wire' _____?
2 I'm not _____ mean by 'an override function'.
3 In _____, the Airbus computer doesn't allow pilots to do any thing dangerous.
4 So _____, on an Airbus the computer has ultimate control ...
5 Can _____ an example?
6 And there are protections to prevent overspeed. _____, it stops the pilot from going faster than is safe.
7 To put _____, sometimes the aircraft should allow manual control.

2 Work in pairs. Take turns to explain how to use a communication system or gadget that you use regularly. When your partner is speaking, ask for explanations as often as possible. Try to use language from 1.

Vocabulary – Safety

15 Complete the expressions with the verbs from the box, then listen again and check.

reduce	stop	do	allow	prevent	increase	limit	make

1 _____ anything dangerous
2 _____ safety
3 _____ the pilot climbing
4 _____ overspeed
5 _____ it safer
6 _____ the pilot's capability
7 _____ manual control
8 _____ the pull-up capability
9 _____ an accident

Pronunciation – /b/ and /p/

1 16 Listen to eight words. Write A or B, according to the word you hear.

	A	B			A	B	
1	bought	port	___	5	lab	lap	___
2	bat	pat	___	6	peg	beg	___
3	tab	tap	___	7	stable	staple	___
4	bet	pet	___	8	bit	pit	___

2 16 Listen again and repeat the words.

3 Take turns to read one word from each line. The person listening must say if they hear A or B.

4 Now practise these sentences.

1 Boeing and Airbus should use the best of both systems.
2 There are protections to stop overspeed.

Speaking

Work in groups. Discuss the questions.

1 In your opinion, is fly-by-wire safer than a conventional mechanical control system?
2 In fifty years' time, how do you think flight control systems will be different?

Section three – Instrument blackout

1 Match the words to the picture. Write a–h.

1 upper ECAM (electronic centralized aircraft monitor) display ___
2 lower ECAM display ___
3 autopilot ___
4 radio management panel (RMP) ___
5 primary flight display (PFD) ___
6 secondary flight display ___
7 speed, altitude and attitude display ___

2 Work in groups. Explain the function of each item.

3 Match the two halves of the sentences.

1	Let's reboot	a	are down.
2	We've lost	b	power back.
3	OK, let's get the system	c	back online.
4	We have a system	d	this out.
5	The system is	e	the system.
6	All the flight displays	f	going again.
7	Let's check	g	is out.
8	The upper ECAM display	h	the autopilot.
9	We've got	i	failure.

4 17 Listen to a conversation from the flight deck of an Airbus A319. Choose a, b or c to complete the sentences.

1 There is a problem with the:
  a fuel system
  b electrical system
  c pressurization system.

2 The pilots solve the problem by:
  a reading instructions on the ECAM screen
  b reading instructions in the manual
  c getting help from maintenance on the ground.

3 The pilots decide to:
  a continue their original flight plan
  b land immediately
  c enter a holding pattern.

5 17 Answer the questions, then listen again and check.

1 Why can't the pilots see?
2 What equipment on the flight deck fails?
3 Why don't ATC respond to the mayday call?
4 Where exactly are the instructions?
5 How many instructions do the crew follow to solve the problem?

6 Work in pairs. Discuss the questions.

- What equipment at work do you have the most problems with? What is the procedure when it won't work?
- What was the last serious problem you had?

Functional English – Giving instructions

18 Complete the sentences from the dialogue. Listen and check.

1 _____ Centre and _____ them what's happening.
2 _____ the system.
3 _____, read the instruction. _____ follow it. Check it _____ you delete it.
4 What's the _____ instruction?
5 First, _____ contact ATC so they know our situation.

Pronunciation – Sentence stress 1

1 18 Listen to the first sentence again. Notice how the words that carry the main meaning of the sentence have the most stress.

Call Centre and tell them what's happening.

Circle the stressed part of the words you think carry the main meaning in the sentences 2–5 in the Functional English section, then listen again and check.

Speaking

Work in pairs. One of you has a technical problem. A colleague looks at a troubleshooting guide on the Internet, and gives you instructions over the phone. Use expressions from the unit, and add as many details as you can.

Situation 1

A	B
blank laptop screen	
	battery?
battery fine (add detail)	
	cables?
fine (add detail)	
	switched on?
yes (add detail)	
	report to manufacturer
agree	

Situation 2

A	B
	other person can't hear you over radio
instruction	
	fine (add detail)
instruction	
	fine (add detail)
instruction	
	fine (add detail)
instruction	
	agree

Section four – Language development

Functional English – Expressing purpose

1 Match the beginnings and endings of the sentences.

1 Repeat the message slowly so that	a restoring it to flying condition.
2 We had to dump some of our fuel in order to	b having all aircraft use this technology in the near future.
3 Controllers and pilots use Datalink to	c discovering ways to reduce aircraft noise.
4 Investigations are carried out for the purpose of	d learning about the latest technologies.
5 Research is being done with the aim of	e expanding its student capacity.
6 A Datalink trial was done with a view to	f land safely.
7 The training school is raising money with the objective of	g the engine didn't catch fire.
8 They're working on the old plane with the intention of	h avoiding similar incidents in the future.
9 They switched off the fuel pumps so that	i I can understand.
10 We went to the conference for the purpose of	j communicate with each other.

Saying things another way

2 Rearrange the words to make sentences.

1 is / do / mean / of / order / out / radar / that / the / you?

2 clarify / I'm / me / let / say / to / trying / what

3 'unlawful interference' / could / explain / just / means / what / you?

4 basically / continue / need / so / heading / to / with / you / your / current

5 do / mean / what / you?

6 an / could / me / explanation / give / you?

7 sure / I / that / not / I'm / understand

8 an / give / can / example / me / you?

9 allow / computer / doesn't / fly / in / manually / other / pilot / the / the / to / words

10 another / have / it / problem / put / serious / to / way / we / a

Giving instructions

3 Match the verbs 1–10 with the words or phrases a–j.

1 access	a an emergency
2 contact	b again
3 declare	c the ECAM
4 do	d the instructions
5 follow	e going
6 keep	f descent
7 lock	g ATC
8 request	h engine 1
9 shut down	i the cabin door
10 try	j a complete check

Vocabulary – Communications

1 Complete the sentences with the words in the box.

speak sequence voice understand text words send routine transmissions congestion communications select pre-formatted responses give message repetition missed deliver

1 It is easier to _____ directly to a pilot rather than write a _____.
2 Datalink allows pilots and ATCs to _____ text messages for _____ communications.
3 The problem with _____ transmissions is that the speaker may be difficult to _____.
4 Datalink allows users to create _____ messages using their own _____.
5 Datalink has the potential to make _____ safe and fast and to reduce _____ on the frequency.
6 Datalink users just need to _____ from a list of _____ text messages.
7 Datalink systems _____ messages between pilots and controllers.
8 It can take time to match messages to _____ when messages get out of _____.
9 If controllers _____ clear traffic instructions, it reduces the need for _____.
10 Using a Datalink system could help with the problem of _____ voice _____.

Vocabulary from the unit

2 Complete the sentences with the verbs from the unit.

afford allow avoid have help need permit required

1 Datalink exists to _____ to make communications more efficient.
2 Maintenance staff will _____ to conform to the new safety requirements whether they like it or not.
3 Air traffic controllers and pilots are _____ to undergo a medical check-up every two years.
4 The officials told the airline that they _____ to improve their current safety record immediately.
5 Commercial pilots are told to _____ flying through military-controlled airspace.
6 The airports agency simply can't _____ to buy a second police service unit.
7 The on-board CCTV cameras _____ the pilots to see if there is a problem in the cabin without leaving the cockpit.
8 The recent regulations _____ all passengers to carry two items of hand luggage.

3 Complete the text with the verbs in the box. Use your dictionary to help you.

adjusted allows developed display eliminate employ features focus needed relies on simplifies utilizes

A glass cockpit is an aircraft cockpit that (1) _____ electronic instrument displays. (2) _____ relatively recently, glass cockpits are highly sought-after upgrades from traditional cockpits. Where a traditional cockpit (3) _____ numerous mechanical gauges to (4) _____ information, a glass cockpit (5) _____ several computer displays that can be (6) _____ to display flight information as (7) _____. This (8) _____ aircraft operation and navigation and (9) _____ pilots to (10) _____ only on the most pertinent information. They are also highly popular with airline companies as they usually (11) _____ the need to (12) _____ a flight engineer.

UNIT 4

ANIMALS

Section one – Wildlife on the ground

1 Match the stories A–D with the subjects. Which one is about an animal

1 being transported illegally? ___
2 damaging an aircraft? ___
3 escaping inside a terminal? ___
4 damaging an airfield? ___

A Rabbits are damaging the runway at a Scottish airport and airport authorities are worried that the animals could make it dangerous for planes to land. Thousands of rabbits are living in tunnels beneath the airfield and holes have appeared on the runway's new surface.

B Cargo workers found 2,400 snakes bound for Hong Kong sent by smugglers in Thailand. Airport officials found the snakes, worth about $75,000, in plastic bags after cargo handlers heard hissing sounds. The banded rat snake is an expensive meal in some Asian countries.

C Flight crews chased a kangaroo after it escaped at Salt Lake City International Airport. Crews were unloading the kangaroo when it broke out of its cage and hopped across the concourse. During the chase, the kangaroo scratched an airport worker and tripped up and hurt its nose.

D American Airlines banned some dogs from its planes after a pit bull terrier escaped from its cage. The crew of the Boeing 757 heard sounds from the cargo hold then the plane's backup radio and some navigational equipment stopped working. When ground crew opened the cargo hold doors, they found the dog had damaged the hold's bulkhead and door and chewed through wires as thick as a garden hose.

2 Work in groups. Discuss the questions below.

1 Do you know of any other incidents involving wildlife loose in airports? Tell the group.
2 What is the most common problem involving wildlife at ground level at an airport you know?

3 Scan the report below to find what the following figures refer to.

1 ¼ mile — the aircraft's distance from O'Hare
2 50 lb ___
3 172 ___
4 $233,000,000 ___
5 97% ___

Animals in the flight path

The Federal Aviation Administration (FAA) reported that two planes preparing to land at O'Hare International Airport aborted their landings after a pilot spotted coyotes near the runway. The flights, operated by United and American airlines, needed to go around, but landed safely on their second attempts. The pilots were about a quarter-mile from O'Hare with their landing gear down when they were warned. The pilot of a flight landing ahead of them saw the coyotes on the grass margins and alerted controllers.

It is not unusual for coyotes to end up on runways – they're seen at O'Hare once or twice a week. Coyotes, which can weigh as much as 50 lb, can cause significant damage to aircraft. In October 2005, a 19-passenger Beechcraft 1900 turboprop hit a coyote on take-off at the Ogdensburg airport. The nose gear collapsed, and the plane skidded to a stop. It was declared a total loss, according to FAA records. The FAA said reports of planes hitting wildlife went up four times from 1,744 in 1990 to 7,136 in 2005 because there are more flights, more wildlife near airports and more reports from pilots. In the same period, 172 people were injured and nine died in such incidents, which resulted in $233 million in losses.

Coyotes know how live in the urban environment, and while fewer coyotes are trapped, more are coming closer to cities to hunt rabbits and birds. The coyotes can be detected by sensors and CCTV and then often need scaring away by airport security workers in cars. But the best way to keep coyotes away is to make sure that the airport's perimeter fences are secure so they can't dig under them.

Airplanes struck wildlife 66,392 times in the USA from 1990 to 2005. More than 97% of those incidents involved birds. Strikes involving other animals were: deer – 652; coyotes – 198; alligators – 14; house cats – 11.

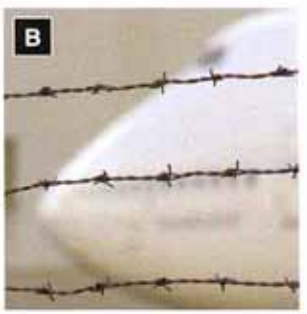
4 Read the text again and decide if the sentences are true or false. Write *T* or *F*.

1 Pilots were warned about the animals 15 minutes before landing at O'Hare. ___
2 A Beechcraft 1900 arriving at Ogdensburg airport collided with a coyote. ___
3 Wildlife strikes went up 80% between 1990 and 2005. ___
4 Airport workers drive at coyotes to scare them away. ___
5 Wildlife strikes in the USA included some pets. ___

Vocabulary – Security measures

Match the words with the features a–h.

1 perimeter fence ___
2 CCTV camera ___
3 grass margin ___
4 bird scarer ___
5 security worker ___
6 bird of prey ___
7 poison ___



Functional English – Expressing necessity

1 Look back at the text and complete these sentences.

1 The flights _____ around.
2 The coyotes ... often _____ away by airport workers in cars.

We use *need* + *to* verb to say when it is necessary to do something. We can use *need* + verb *-ing* to talk about how to improve or fix something without saying who will do it.

2 Work in pairs. Look at the vocabulary in the pictures and explain why each thing is necessary. Use the language from 1.

3 Work in groups. Discuss the questions.

1 What do pilots and ATCs need to do to prevent bird or animal strikes?
2 How could the airport you know best improve its prevention of wildlife strikes?

Section two – Animals on the loose

1 Match the words with the pictures.

1 containers ___
2 pallets ___
3 fork-lift truck ___
4 cage ___
5 hinge ___
6 cargo net ___

2 Work in pairs. Discuss the questions.

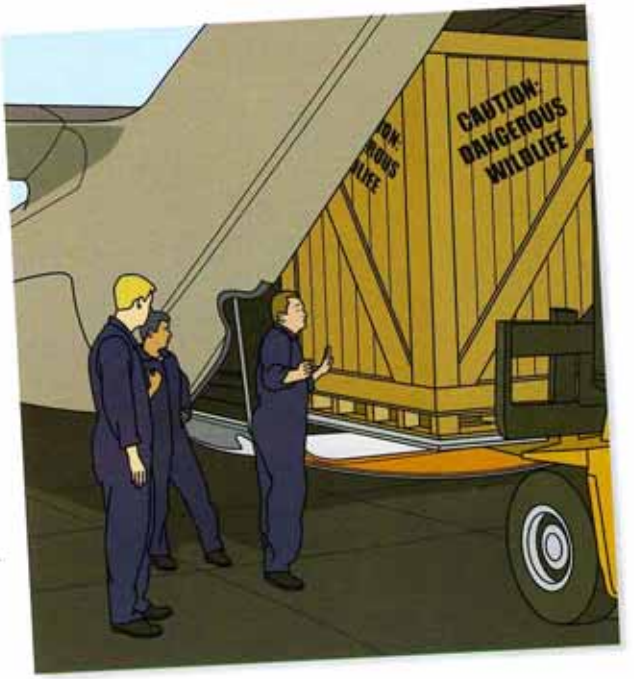
1 What animals are most often transported by air?
2 What problems can animals cause on cargo aircraft?

3 19 Listen to the conversation between pilot and ground crew, and answer the questions.

1 What's the problem?
2 What happens in the end?

4 19 Listen again and underline the correct information.

1 The flight is *inbound / outbound.*
2 The cages are in the *fore / aft* hold.
3 The ground crew are *unloading / loading on* the animals.
4 The plane is due to *take off / push back* at *1255 / 1305.*
5 The pilot wants the ground crew to *have a look / go back* in the hold.
6 The *bars / lock* and *hinge / floor* of the cage broke.
7 The pilot wants to call *security / a vet.*



Functional English – Expressing preferences

1 Work in pairs. Try to complete these sentences from the dialogue.

1 I _____ miss our slot.
2 I _____ know what's going on in there before I make any decisions.
3 This is what I _____ do.
4 I _____ put themselves in danger.
5 I _____ get some help with this.

2 20 Listen again and check, then listen again and repeat the sentences. Notice how *to* is pronounced.

3 Complete the sentences with the words in the box.

like me to repeat prefer not to do like to cut
prefer people to speak like to give want to work
'd rather work want us to clean prefer to be
wants to do

1 I _____ for our national airline someday.
2 I'd _____ long-haul flights, if possible.
3 I'd _____ based abroad.
4 Do you _____ the windshield?
5 I'd _____ down the number of hours I work.
6 We wouldn't _____ advice until we know your position.
7 I _____ slowly and clearly.
8 Nobody else _____ night flights, but I enjoy them.
9 Would you _____ that information?
10 I work for a large airline, but I _____ for a smaller one.

4 Use these expressions to make true sentences about your current job. Then work in pairs to talk about what you have written.

I don't want to _____
I wouldn't like to _____
I'd rather _____
I want someone to _____
I'd prefer to _____
I'd like to _____
I'd like my employers to _____

Pronunciation – Word endings

21 Listen and repeat the sentences, starting with the last word. Notice how the end of one word seems to join the beginning of the next.

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

Functional English – Explaining unknown words

1 Here are examples from the dialogues when people explain what words mean.

The thing that *holds the door onto the cage is broken.*
We've got a cargo net ***for*** *catch****ing*** *him.*

Here are some more ways to describe an object. What thing are they describing?

*It****'s made of*** *steel.*
*It****'s something for*** *mov****ing*** *large quantities of goods.*
*It****'s used to*** *transport goods overseas.*
This ***is something that*** *help****s*** *companies operate worldwide.*

2 Work in pairs. You are going to practise describing words. Student A, go to p 104, Student B, go to p 109.

Section three – Bird strike

1 Work in pairs. Discuss what kinds of damage a bird strike can cause.

2 22,23,24 Listen to the recording and decide if the sentences are true or false. Write *T* or *F*.

1 The plane is hit by four birds. ___
2 The crew increases power on engines two and three. ___
3 They can't see through the windshield clearly after the strike. ___
4 The pilot has difficulty turning left. ___

3 Listen again and answer the questions.

1 At what height does the plane strike the birds?
2 How much fuel is on board?
3 Why doesn't the pilot want to land immediately?
4 What actions does the pilot intend to take next?

Pronunciation – Sentence stress 2

1 23 Listen to a section of the dialogue again, and complete the sentences.

1 _____ strike!
2 _____ birds!
3 _____ running.
4 _____ power?
5 _____ left.
6 _____ one.
7 _____ level.
8 _____ one.
9 _____ thrust.

2 23 Listen again and underline the stressed syllables.

3 23 Listen again and repeat the sentences.

4 Work in pairs. Practise the section of dialogue, until you can do it without looking at your book.

Functional English – Saying intentions

1 24 Listen to a section of the recording again and complete the dialogue.

C S27H. Say (1) _____.
PNF What are we (2) _____ to do? Go around to the left?
PF Yes. I don't (3) _____ to land with this much fuel on board. Turn left, dump fuel and get back down.
PNF We're (4) _____ 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 (5) _____ to turn left.
T S27H. Understand you are unable to make right turns. Turn left at your (6) _____.
PNF Turning left, heading 340. S27H.
PF OK, we need to dump fuel as soon as possible.
PNF We (7) _____ to dump fuel to landing weight. S27H.

2 Complete the sentences with the words in the box.

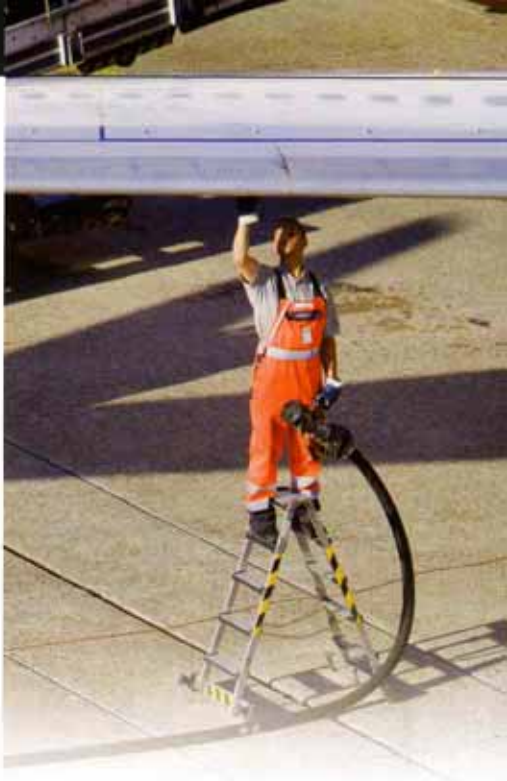
going to | are going | not planning | plan to | you going | to ask

1 We _____ to maintain 5,000 ft.
2 I intend _____ control to chase the geese off the runway.
3 I _____ have maintenance check the wings.
4 We aren't _____ dump fuel until we're nearer the airport.
5 I'm _____ to inform the passengers yet.
6 Are _____ to activate emergency services?

Speaking

Work in pairs. Student A, you are the pilot of WindAir 87. Student B, you are the ATC. Spend a few minutes thinking about what you are going to say, then act out the dialogue. Then change roles.

Pilot	ATC
	Warn of birds possibly in flight path
Declare bird strike. Invent details	
	Fire coming from engine. Declare emergency?
Yes. Shut down engine	
	Intentions?
Go around to right / left	
	Fuel on board? Dump fuel?
State fuel. Not land with so much. Dump	
	Dump one minute
OK. Dump and continue right / left turn to runway	



Section four – Language development

Functional English – Expressing necessity

1 Underline the correct form of the verb.

1 The cabin needs *to clean / cleaning.*
2 The controller needs *to get / getting* in contact with someone in the next sector.
3 The undercarriage of the Boeing 747 needs *to repair / repairing.*
4 We need *to change / changing* the current radio frequency.
5 The aircraft will need *to refuel / refuelling* on arrival at JFK.
6 Our technician needs *to come / coming* and fix the radar.
7 The landing gear needs *to check / checking* for any damage.
8 The emergency services need *to park / parking* near the end of the runway.
9 The windshield needs *to replace / replacing* as it has a big crack in it.
10 The trainee needs *to spend / spending* some time working in a different sector this week.

Expressing preferences

2 Express your preferences about the following things using the word in brackets.

1 work nights or days? (prefer) I'd prefer to work days because ...
2 travel on an Airbus A380 or on a Boeing 787 Dreamliner? (rather) _____
3 make voice transmissions or send text messages? (prefer) _____
4 work in a team or alone? (like) _____
5 speak English or your own language at work? (want) _____
6 fly long distances or short distances? (rather) _____
7 pilot a plane with or without passengers? (prefer) _____
8 regular hours or shifts? (not want) _____
9 deal with an unruly passenger or a sick passenger? (not like) _____
10 travel first class or economy class? (rather) _____

Explaining unknown words

3 Complete descriptions 1–10 with words from the box, and match each one to an object a–j.

're made the thing	's used used for	made of used to	something for are used	something that use to

1 It's _____ a strong synthetic fibre and foam.
2 It's _____ steering the plane.
3 It's _____ record flight data.
4 It's _____ helps controllers detect and track objects.
5 They _____ of glass.
6 It's _____ detecting a possible fire.
7 It's _____ that cabin crew use to serve food and drinks.
8 It _____ to store luggage.
9 It's what we _____ communicate with air traffic controllers.
10 They _____ to help pilots and controllers to hear and speak easily.

a control column
b flight strip
c headsets
d lifejacket
e overhead locker
f radar
g radio
h smoke alarm
i trolley
j windshield

Saying intentions and expectations

4 Rearrange the words to create sentences expressing intentions or expectations.

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

Vocabulary – Security measures

1 Complete the sentences with the words from the box.

bird scarer | CCTV cameras | metal detectors | perimeter fence | poison | police unit | security worker | sensor | sniffer dog | traps

1 A _____ is used in airports to detect illegal items in people's luggage.
2 Every person boarding a flight must walk through _____.
3 A _____ is a piece of equipment that reacts to physical changes such as heat, light or movement.
4 _____ are sometimes used for catching animals near a runway.
5 A _____'s job is to protect a building and / or its surroundings.
6 A _____ is a structure made of wire that surrounds an airport for security.
7 _____ are placed around an airport to monitor what is happening.
8 A _____'s role is to frighten birds from the aerodrome airspace.
9 _____ is often used to kill animals or birds found near a runway.
10 Some airports have their own _____ to deal with any crimes on location.

Vocabulary from the unit

2 Rearrange the letters to find the synonyms of words from the unit.

1	**eiksrt**	to hit
2	**deijnru**	hurt
3	**acellops**	to fall
4	**raelt**	to warn
5	**ehlo**	crack
6	**beknor**	out of order
7	**aaddegm**	broken
8	**egiinnost**	intake
9	**accdehrst**	scraped
10	**rtbsu**	punctured

UNIT 5

GRAVITY

Section one – Ultralight

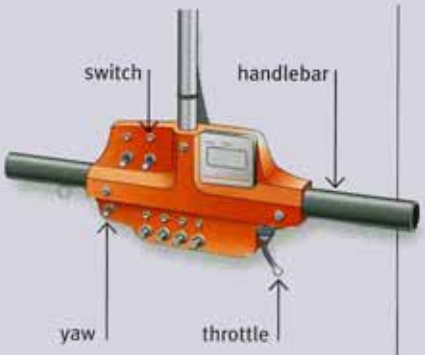
1 Discuss in pairs. What's the smallest aircraft you have:

- flown?
- flown in?
- seen?

2 Work in pairs. Look at the picture of the GEN-H4 and guess the answers to the questions.

1 What is it?
   a a gyrocopter
   b a helicopter
   c a hang-glider
2 How many blades does it have?
3 How is it powered?
4 How fast can it fly?
5 How is it controlled?
6 Do you need to be a licensed pilot to fly it?
7 How long does it take to assemble it?

3 Read the article from *Kitplane Monthly* magazine and compare your answers with the text.



The GEN- H4 is the smallest co-axial one-man helicopter in the world. It is equipped with miniature engines of 125 cc (8 HP) and two rotors, each with two blades. It can fly up to a maximum altitude of 1,000 m at a top speed of 90 kmh (59 mph) for up to 30 minutes. The rotors have a length of only 4 m (118 inches), so no parking problems.

The pilot controls the **pitch**, **roll** and **yaw** of the craft by means of a handlebar, using weight-shift to change direction. Pushing the throttle controls **climb**. As you add rpm, the fixed-pitch blades provide more **lift**. To move forward, you pull the handlebar toward you. You turn left or right by flicking a yaw switch with your left thumb, which changes the rotation of the two upper blades.

I first saw the GEN-H4 flying at the Newham Air Show, and it was impressive in action. The pilot climbed to about 100 ft, rolled to the right and performed a wide **turn**. He then straightened up and alternated pitching up and down. Sensibly there were no steep **dives**, but a controlled descent to just above the ground. After a further series of flight manoeuvres, he hovered above the runway before throttling back and **sinking** gently to the ground.

Because it falls into the ultralight category, you don't need to be a licensed pilot to fly this machine. Training is not a lengthy process, but you will need several sets of spare rotor blades. One pilot said that when he was teaching himself to fly he went through four sets of blades before he learned to control the helicopter without **tipping over**.

There are no worldwide standard definitions for ultralight aircraft. So make sure you check the regulations in your own country before you buy. The GEN-H4 comes in kit form and can be assembled in 40 hours.

62 [illegible] Kitplane Monthly

Functional English – Explaining how something works

1 Try to remember the missing words in these sentences from the article, then look back and check.

1 The pilot controls the pitch, roll and yaw of the craft _____ a handlebar, _____ weight-shift to change direction.
2 _____ the throttle controls climb.
3 You turn left or right _____ a yaw switch with your left thumb.

2 Complete these sentences about basic control of a fixed-wing aircraft using the words in the box.

adjust **by means of** **by means of** **by moving** **by raising**
changes **controls** **lowering** **move** **moving** **pushing** **turns**

1 Cockpit controls _____ the control surfaces _____ rods, cables and pulleys.
2 _____ the control yoke left or right _____ roll.
3 You control the rudder _____ pedals.
4 You _____ the pitch _____ the control column backwards or forwards.
5 _____ the left-hand pedal _____ the aircraft to the right.
6 The pilot _____ the pitch of the aircraft _____ or _____ the elevators.

Vocabulary – Manoeuvring an aircraft

1 Work in pairs. Look at each of the **bold** words in the text (*pitch*, *roll*, etc.) and use your hands to demonstrate them.

2 Take turns to answer the questions about the GEN-H4. Listen to your partner's answers and say if you agree.

1 What do you do by increasing the revs?
2 How do you turn left?
3 What happens when you throttle back?
4 How do you roll right?
5 What happens if you shift your weight too quickly when taking off?
6 How do you adjust the pitch of the aircraft?
7 What do you do by keeping the throttle open and not shifting your weight?
8 How do you land?

3 Tell your partner about the most unusual aircraft you've ever flown, or the most unusual vehicle you've ever driven or ridden in. How were its controls unusual?

Speaking

Work in small groups. Discuss the questions.

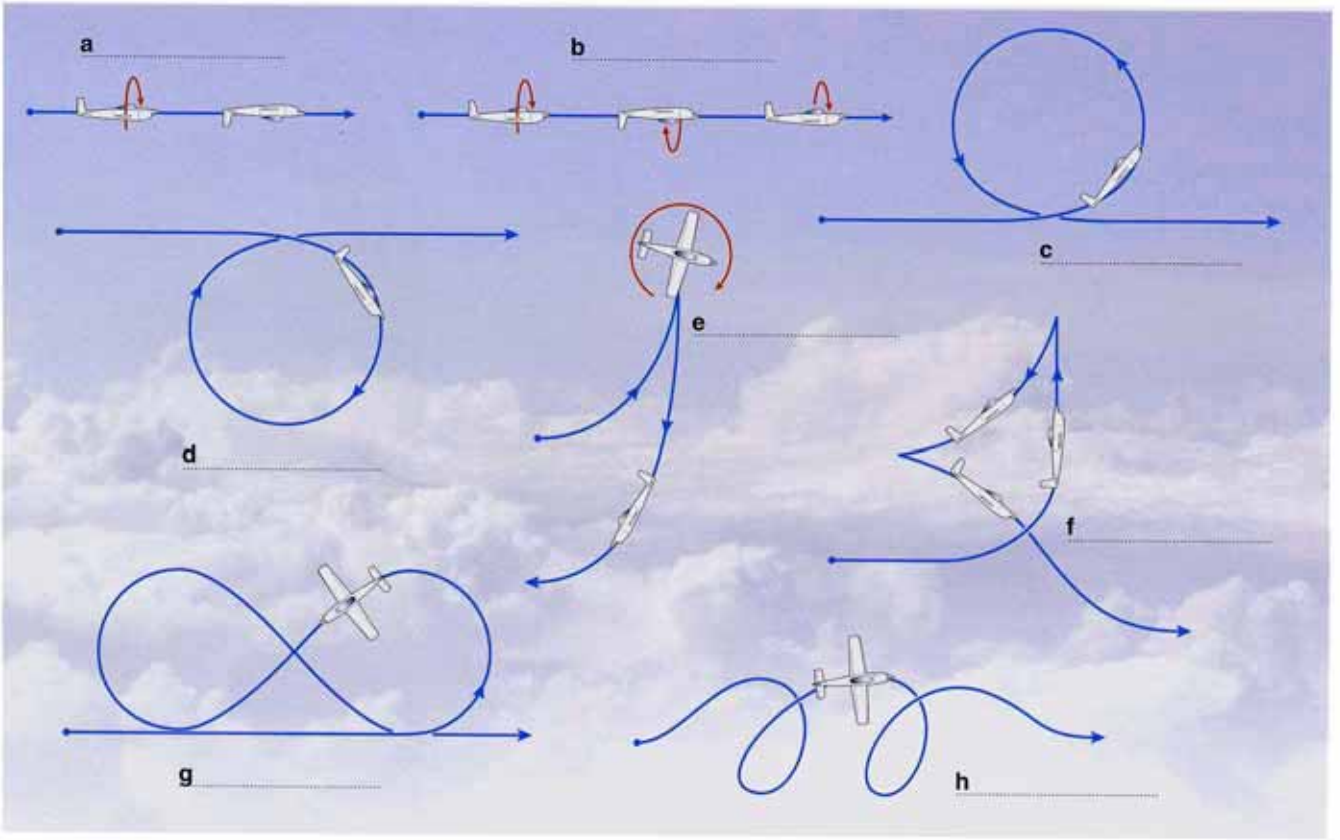
1 What are the regulations for ultralights in your country? Is it legal to fly a GEN-H4?
2 Should pilots have to be qualified before they are allowed to use ultralights?
3 What are the advantages and disadvantages of fixed wing aircraft compared to rotary wing aircraft?
4 Would you like to fly a GEN H4? Why / Why not?

Section two – Air race

1 Work in small groups. Discuss the questions.

1 What do you know about the Red Bull air race?
2 How are the racing aircraft different from conventional aircraft?
3 Describe the most amazing aerobatic manoeuvres you have seen (not necessarily in an air race).

2 25 Listen to a radio interview with Brazilian world champion pilot Thiago Silvo Corbera. Number the manoeuvres 1–8 in the order he describes them.



3 25 Listen again and write the names of the manoeuvres he describes next to the pictures. The words you need are in the box (two words are not needed).

inside half barrel full outside death tail Cuban hammerhead slide loop spin roll eight

4 25 Listen again and answer the questions.

1 Which is Thiago's favourite manoeuvre?
2 Which is more important in an air race – speed or manoeuvres?
3 What plane is Thiago flying?
4 How much does Thiago's plane weigh?
5 How many degrees do the control surfaces deflect as a minimum?
6 What happened to Thiago in the 2007 race?
7 How is Thiago feeling about today's race?

Vocabulary – Units of measurement

1 26 Work in pairs. Discuss how you say these units of measurement. Then listen and repeat.

ft	m	ft^2	km	f/m	°/s	kt
*g*s	nm	m^2	lb	kg	HP	m/m

2 27 Listen and complete the table with the specifications of Thiago's aircraft.

3 28 Discuss with your partner how to say these numbers in plain English. Then listen and repeat.

1 6.51
2 651
3 6,501

specifications	Extra 300s	
	non-metric	metric
length	ft	m
height		
weight (unladen)		
wing area		
g-rating	+/-	
engine		
max. speed / VNE		
stall speed / VS		
climb rate		
roll rate		
range		

Speaking

You are going to exchange information about two more racing planes. Student A go to p 105. Student B go to p 109.

Functional English – Comparing and contrasting

1 Work in pairs. Discuss what the missing word is in each sentence.

1 The CAP 232 is longer _____ the MX2.
2 The Extra 300s is _____ longest.
3 The CAP 232 is a _____ heavier than the MX2.
4 The MX2 is the _____ powerful.
5 The Extra 300s's range isn't as great _____ the MX2's.

2 Write two sentences comparing the racing planes using each of the adjectives in the box.

heavy powerful tall fast

3 Work in pairs. Discuss the questions. Try to use expressions from 1.

1 In your opinion, what plane has revolutionized air travel? How is / was it different from other planes?
2 What is your favourite type of plane? Why?
3 What is your favourite airport? Why?

Section three – Hydraulic loss

1 Work in small groups. Discuss the questions.

1 What problems can hydraulic failure cause for:
   a airborne aircraft?
   b air traffic control?
2 Is hydraulic failure common? Why / Why not?
3 Do you know of any incidents or accidents related to hydraulic problems?
4 Make a list of the parts of an aircraft that can be affected by hydraulic failure.

2 29 Listen to the first part of a conversation between a pilot and an approach controller. Does the pilot mention any of the parts you listed?

3 Underline the correct words to complete the controller's summary of the situation.

Executive 56 has (1) *no / low* pressure in their hydraulic system. It is difficult for the crew to control the (2) *yaw / bank* and the pitch of the aircraft. They can only make (3) *small / big* turns and they are using (4) *asymmetrical thrust / the control surfaces* to turn. They would like to try and fly (5) *west / east* of the airport for a (6) *short / long* final.

4 30 Tick (✔) the things you think will happen. Add two more. Then listen and check your answers.

The crew will ...

- ☐ execute a missed approach
- ☐ be forced to ditch the aircraft in a field
- ☐ adopt landing configuration to control speed and height
- ☐ _____

The controller will ...

- ☐ give the crew vectors to the runway
- ☐ ask the pilot to switch frequency to the tower controller
- ☐ _____

5 31 Listen to the final exchange between the pilot and the controller. What happened to Executive 56 in the end?

Functional English – Expressing difficulty and offering help

32 Work in pairs. Try to remember some of the words and expressions that complete the sentences from the conversation. Then listen and complete the sentences.

1 We're _____ controlling the attitude.
2 It's _____ establish level flight.
3 Just tell me _____ and _____ for you.
4 We're _____ keep it straight and level.
5 _____ emergency assistance at the far end of the runway?
6 _____ line you up with the end of the runway right now?
7 We're really _____ follow a heading.
8 Is _____ you need?

Pronunciation – Tonic stress

1 32 In Unit 3 we looked at how the words that carry most meaning in a sentence are stressed. In addition, the word that the speaker thinks is the **most** important carries even stronger emphasis than the others. Listen to how the intonation rises on the word *attitude* in the sentence.

We're having trouble controlling the attitude.

2 32 Work in pairs. In sentences 2–8 of *Functional English*, discuss which word or part of a word you think should carry the most stress, and circle it. Then listen to the sentences again.

3 32 Listen and repeat the sentences. Then, with a partner, practise saying the sentences, concentrating on making your intonation rise on the most important word. Listen carefully and give feedback on your partner's pronunciation.

Speaking – Helping a pilot in difficulty

1 Work in pairs. For each situation, decide what things the pilot is having difficulty with, and what help the air traffic controller could offer. Then roleplay the situations, using expressions from the unit.

	pilot having difficulty with	help offered by ATC
1 A light aircraft has landed in marginal weather and skidded off the runway onto the field.		
2 A helicopter has total hydraulic failure.		

2 Change partners and roleplay the situations again.

Section four – Language development

Functional English – Explaining how something works

1 Underline the correct option.

1 A pilot is able to steer a plane *by means of* / *by* flight controls.
2 Controllers are able to observe the progress of a flight *through* / *with the use of* radar.
3 The second level in the Airbus A380 is accessed *by the way of* / *by way of* a curving set of stairs.
4 Pilots keep unwanted passengers out of the cockpit *by* / *with the use of* locking the door.
5 The Boeing 747 is powered *by way of* / *by* four engines.
6 *With the help of* / *By* an escape chute, passengers and crew are able to evacuate the aircraft quickly.
7 Flight safety is maintained *through* / *using* regular maintenance checks.
8 Aerodrome controllers are able to see aircraft clearly *by way of* / *with the help of* binoculars.
9 You climb and descend *using* / *through* the throttle controls.
10 The presence of ice on aircraft wings is reduced *through* / *by means of* de-icing chemicals.

Comparing and contrasting

small → smaller easy → easier important → more important far → farther / further

2 Change adjectives 1–10 to comparatives.

1 bad → _____
2 quick → _____
3 fast → _____
4 good → _____
5 busy → _____
6 short → _____
7 windy → _____
8 serious → _____
9 tall → _____
10 urgent → _____

3 Complete the sentences using the words in the box. Not all the words are needed.

a bit	a lot more	as good	as many	farther than	fewer
longer than	more	most important	much heavier	powerful as	

1 Steel is _____ than aluminium.
2 The Airbus A320 is as _____ the Boeing 747.
3 An Airbus A380 is _____ Concorde.
4 French ATCs are _____ as controllers in Germany.
5 The _____ function of an air traffic controller is to ensure the safe separation of air traffic.
6 The Airbus A320 can carry _____ passengers as the Boeing 747.
7 A jumbo jet is able to fly _____ a light aircraft.
8 Captain Emery flew _____ miles than Captain Roberts last year.

4 Complete the sentences by putting the adjective in the comparative form.

1 Heathrow is much _____ (busy) than London's other airports.
2 They are making the airport _____ (big) to accommodate increased traffic.
3 Air travel was a lot _____ (expensive) a few years ago.
4 Air traffic control systems are getting _____ (safe) all the time.
5 Modern planes are _____ (fuel-efficient) than planes thirty years ago.
6 The flight was _____ (long) than usual because there was a strong headwind.

Expressing difficulty and offering assistance

5 Rearrange the words to make complete sentences.

1 having / I'm / is / pilot / saying / the / trouble / understanding / what _____
2 background / because / difficult / hear / it's / noise / of / the / to / you _____
3 control / fighting / plane / the / to / we're _____
4 air / in / increase / keep / struggling / with / the / they're / to / traffic / up _____
5 assistance / you / emergency / like / would ? _____
6 anything / is / need / else / there / you ? _____
7 and / for / get / I'll / it / need / me / tell / what / you / you _____

Vocabulary – Manoeuvring an aircraft

1 Match the beginnings with the endings to make sentences.

1 The pilot flew inside a loop and ...	a forward on the stick
2 He did a full roll ...	b the helipad before landing.
3 And then they yaw ...	c the throttle controls to climb.
4 They lost control and started to ...	d pitched up into a circle.
5 Aerobatic manoeuvres involve ...	e several hundred feet.
6 You start a dive by pushing ...	f tipping over.
7 They increased power and climbed ...	g by rotating 360°.
8 He eventually learnt to control the helicopter without ...	h 180° to a nose-down.
9 In a GEN-H4 you twist ...	i lose altitude.
10 The helicopter hovered above ...	j a lot of training and skill.

Vocabulary from the unit

2 Rearrange the letters in the words from the unit to complete the definitions.

1 An aeroplane is a **defix-ginw** aircraft. _____
2 A helicopter is an example of **aorrty-igwn** aircraft. _____
3 A **gahn-edgilr** is a simple aircraft with no engine that you lie underneath and control by shifting your weight. _____
4 A **lergid** is a light plane with no engine. _____
5 A **wto ckrtu** or tug is a vehicle used to taxi aircraft. _____
6 If something is **aegikln**, liquid or gas is coming out of it through a hole. _____

HEALTH

Section one – Is there a doctor on board?

1 Label the first-aid kit with the words from the box.

bandage ___ defibrillator ___ EpiPen ___ inhaler ___
plaster ___ insulin pen ___ splint ___

2 Match each of the events or injuries with the item of medical equipment that treats it.

1 a severe allergic reaction ___
2 a diabetic episode ___
3 a cut ___
4 a limb fracture ___
5 a severe asthma attack ___
6 a serious head injury ___
7 a heart attack ___

3 Read the article. Match the sections A–E to events 1–7. Some sections may match more than one event.

A ___ B ___ C ___ D ___ E ___

Is there a doctor on board?

A You're midway through a routine flight, when suddenly a passenger collapses clutching his chest and struggling to breathe. This is one of the situations that cabin crew are trained to deal with, and aircraft are equipped for. So what are some of the most common medical emergencies?

This event – a heart attack – is the leading cause of in-flight death, and the leading medical cause of diversions. Medical kits include aspirin and a vasodilator spray to keep the blood flowing when there is chest pain. In case of **cardiac arrest**, cabin crew are trained to give CPR, while many airlines now also carry defibrillators to restart the heart. **Cardiac monitors** are used increasingly, so that data can be transmitted to medical advisors on the ground.

B A large number of diversions are caused by injuries to passengers. Items falling from the overhead storage bins are a common cause of head injury, while unexpected turbulence can easily result in broken bones. **First-aid kits** are equipped with splints and bandages to stabilize **limbs**, as well as plasters for minor cuts.

C Asthma is a common condition that can be life-threatening, especially when the sufferer's inhaler is in the baggage hold. In addition to oxygen, bronchodilators and adrenaline are kept in order to open up the **airways**.

D Dangerous breathing problems can also result from severe allergic reaction, which worries airlines so much that some no longer serve peanuts. Most carry EpiPens, as well as antihistamine and adrenaline to prevent **anaphylactic shock**.

E Most medical kits contain glucose and glucagon **injections** to treat passengers who suffer hypoglycaemic **episodes**. The disruption of regular eating habits can lead to a dangerous drop in blood sugar levels.

4 Read the article again and answer the questions.

1 What event causes most deaths on board planes?
2 What are the two main causes of injury?
3 When can asthma be especially dangerous on flights?
4 What have some airlines done to prevent dangerous allergic reactions?
5 Why do diabetics sometimes have problems when flying?

5 Work in pairs. Discuss the questions.

1 Have you received training to deal with medical emergencies? What were the most important things you learned?
2 Have you ever witnessed a medical emergency in your job? What happened?

Functional English – Expressing cause and effect

Try to remember the words and expressions from the article, then look back to check.

1 This is the _____ of in-flight death.
2 A large number of diversions are _____ injuries to passengers.
3 Unexpected turbulence can easily _____ broken bones.
4 Dangerous breathing problems can also _____ severe allergic reaction.
5 The disruption of regular eating habits can _____ a dangerous drop in blood sugar levels.

Vocabulary – Medical emergencies

Match the words in **bold** in the text with a definition below.

1 the tubes in the body that we breathe through _____
2 a sudden attack of an illness _____
3 a box containing emergency medical supplies _____
4 the arms and legs _____
5 a machine for checking how well the heart is working _____
6 a sudden and extremely dangerous allergic reaction _____
7 the sudden stopping of the heart _____
8 a small measure of medicine for putting into the body through a needle _____

Speaking – Saving the life of your airline

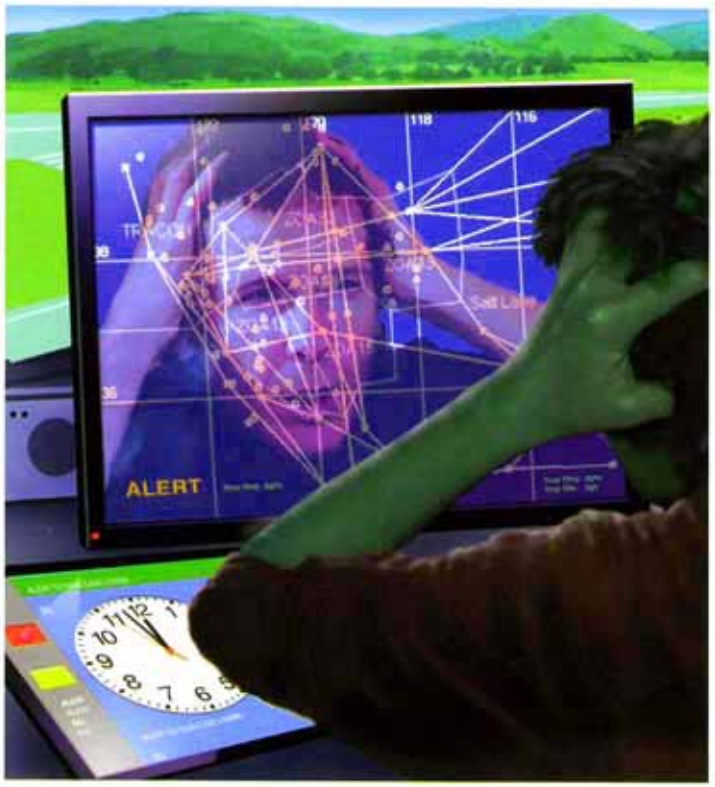
1 Read the situation.

You work for a small airline which has had to make a record number of diversions due to medical emergencies in the past year. As a result, it is in serious financial trouble, and it must avoid any more diversions. It has offered a prize for the best suggestions to help it achieve this.

Work in pairs. Think of five inexpensive measures it can take to achieve this. Write down your ideas as five action points. Be creative!

2 Share your ideas with the group. Vote on the five most original.

Section two – Stressed?



1 Match the adjectives with their definitions.

1	run down	a	extremely tired
2	stressed	b	a bit depressed
3	overworked	c	feeling under pressure
4	exhausted	d	anxious about something
5	worried	e	having to work more than you are able to
6	irritable	f	unable to concentrate
7	down	g	unhealthy because of too little sleep and too much work
8	unfocused	h	easily annoyed

2 Choose three of the adjectives. Tell your partner about the last time your work made you feel like that.

3 Make a list of things that can cause someone stress in their life.

4 33 Listen to part of a workshop on 'Dealing with stress', and tick (✔) the reasons you listed that are mentioned.

5 33 Listen again and note down the ways for dealing with stress that people suggest.

6 Work in pairs. Discuss the questions.

1 Does stress often affect people in your job? Why / Why not?
2 What tells you that a colleague is becoming stressed?
3 What can an employer do to reduce stress in its employees?

Functional English – Making suggestions and giving advice

1 33 Work in pairs. Try and remember the words and expressions from the workshop. Then listen again and check.

1 _____ identify the sources of stress.
2 Some experts _____ keeping a diary ...
3 You _____ try and take holidays from work regularly ...
4 I think _____ to talk to a friend about your problems and feelings.
5 ... you _____ get professional help on how to deal with it.
6 For me, the _____ dealing with stress is to make sure you exercise, eat and sleep well.
7 And if you can't sleep at all, well, then _____ see your doctor.
8 _____ is to try and make more time for those things you enjoy.
9 I _____ a stressed friend or colleague to try some stress-reducing techniques ...

2 Complete these sentences giving advice about minimizing the effects of jet lag using the words in the box.

advise can help may want shouldn't suggest suggest try and

1 You _____ take a nap when you arrive.
2 I _____ you drink plenty of water before, during and after the flight.
3 It _____ to take a melatonin supplement when you arrive.
4 You _____ to keep to your home schedule on a short trip.
5 I _____ scheduling important meetings to times that correspond to waking times at home.
6 _____ avoid light at times when it would be dark at home.
7 I would _____ you to avoid heavy meals at a time when you would have a light meal at home.

Pronunciation – Consonant clusters 1

1 34 Words beginning with more than one consonant can cause misunderstandings. Listen and repeat these words from the workshop.

stress *pressure* *spending* *flaps* *flight* *breakdown* *specific* *plans*

2 35 Rearrange the words to form sentences. Then listen and check your answers. Practise saying the sentences with the recording.

1 still / we're / to / get / slot / a / struggling

2 light / brake / the / blinking / is

3 enough/ drive / on / to / is / runway / the / dry ?

4 need / are / frozen / and / flaps / freeing / the

5 the / wipe / grease / the / I'll / glass / off

6 tried / to / I've / the / fixed / twice / trouble

7 threat / country / throughout / of / there's / strikes / a / the

Speaking – Giving advice

1 Work with a partner who does the same job as you. As an experienced worker, you have been asked to prepare a short talk on 'Minimizing stress' for people just starting their career. Identify the times when they can expect to feel stressed, and prepare a number of tips to help them deal with this.

2 Form small groups. Give your talk to the group.

Section three – Medical emergency

1 36 Listen to the dialogue and answer the questions.

1 Who do the flight crew contact and speak to?
2 Why do they speak to these people?
3 What activity caused the passenger's illness?

2 36 Listen again and underline the correct information.

1 The sick passenger is *Belgian / Egyptian.*
2 The flight is *on its way to / departing from* Egypt.
3 The sick passenger is about *19 / 29* years old.
4 The sick passenger is sitting at the *front / back* of the plane.
5 He has been on *holiday / a business* trip for *five / ten* days.
6 The flight's planned destination is *France / somewhere on the Red Sea.*
7 The flight has been airborne for *50 / 15* minutes.
8 The medical advisor tells the captain to *return to the airport / descend immediately.*

3 36 What are the passenger's symptoms? Listen again and tick (✔) the symptoms you hear.

☐ trouble breathing ☐ shaking ☐ very pale ☐ in great pain
☐ coughing blood ☐ sweating ☐ vomiting ☐ losing consciousness

Functional English – Giving and asking for updates

1 37 The crew update the medical advisor with the latest news of the situation. Work in pairs. Try to remember the missing words, then listen and check.

1 We _____ moved the other passengers away.
2 _____ removed his seat belt?
3 We _____ found anything else _____.
4 _____ eaten or drunk anything?
5 I _____ looked in his hand luggage.

2 Discuss the questions.

1 What tense is used in these sentences.
2 How is it formed?

3 Complete the dialogue using the expressions in the box.

've already done	has fallen	's cut	haven't taken it yet	's lost	hasn't stopped yet	's just regained

Captain A laptop (1) _____ on an elderly female passenger.
She (2) _____ her head very badly. She (3) _____ consciousness.
Medical advisor Has the bleeding stopped?
Captain No, it (4) _____.
Medical advisor You need to put a bandage on it.
Captain We (5) _____ that. It's still bleeding though.
Medical advisor How's her pulse?
Captain We (6) _____. Ah – she (7) _____ consciousness.
Medical advisor That's good. You can give her oxygen if necessary.

Pronunciation – Intonation of lists

1 38 Listen to the sentence from the dialogue and notice the intonation.

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

2 Draw an arrow ↗ or ↘ to show where the intonation rises and falls in the following lists.

1 Nausea, dizziness, losing consciousness and sweating.

2 She's trembling, coughing and crying.

3 Lie the passenger down, put him in recovery position and call MedLink.

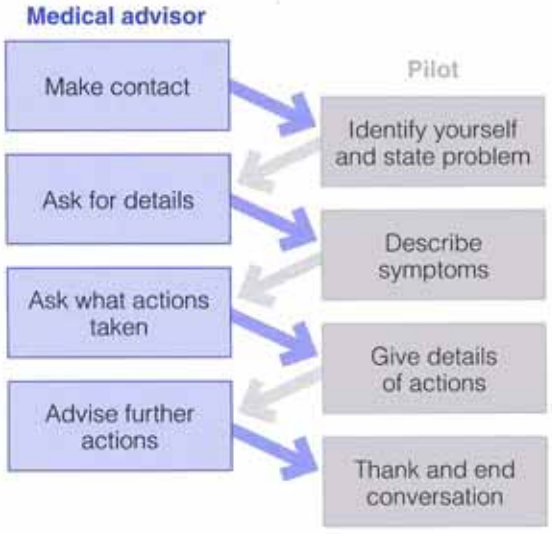
3 39 Listen and check your answers, then listen and repeat.

Speaking

1 Work in pairs. For each of the medical problems below, share your knowledge to write a list of three symptoms you would expect someone to have. Then, write a list of actions that should be taken to help the person.

condition	symptoms	actions
heart attack		
hypoglycaemic episode		
fractured arm		
severe allergic reaction		

2 Change partners. Roleplay the situations, inventing details where necessary. Take turns to be the captain and the medical advisor.



Section four – Language development

Functional English – Expressing cause and effect

1 Complete sentences 1–10 with the prepositions from the box.

from	in	by	of	to

1 An epileptic fit is caused _____ a sudden burst of excess electrical activity in the brain.
2 Excessive alcohol consumption is the leading cause _____ air rage.
3 Poor judgement by the pilot almost resulted _____ a fatal incident.
4 Several flights have been diverted as a result _____ storms.
5 For controllers and pilots, lack of sleep can lead _____ errors.
6 Aviation accidents are often caused _____ human error.
7 Better training for flight crew resulted _____ fewer passenger fatalities.
8 The leading cause _____ flight delays is poor air traffic management.
9 Better flight safety has resulted _____ improvements in technology.

Making suggestions and giving advice

2 Underline the correct option.

1 You won't be able to board the plane, sir. Please try *to calm down / calming down.*
2 You should *take / taking* a thick coat and a hat, because Moscow is cold!
3 She was advised *to go / going* to passport control immediately.
4 Due to the reported severe turbulence, they suggested *to follow / following* a revised flight path.
5 To avoid deep vein thrombosis, it can help *to walk / walking* around the cabin during the flight.
6 The passenger had a very bad headache, so the flight attendant suggested *take / taking* an aspirin.
7 It's a good idea *to go / going* through the passenger's belongings to see if they are taking any medication.
8 A good way of *stabilize / stabilizing* a broken limb is to use a splint.
9 You may want *to move / moving* the patient to the rear of the plane, away from the other passengers.
10 Try *giving / to give* the passenger an aspirin – that may relieve his chest pain.

Giving and asking for updates

3 Rearrange the words to make complete sentences.

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

Vocabulary – Medical emergencies

1 Match the emergencies 1–7 with their synonyms a–g.

1	an allergic reaction	a	a broken bone
2	a diabetic episode	b	early labour
3	air rage	c	hypoglycaemic episode
4	an asthma attack	d	cardiac arrest
5	a fracture	e	an agitated or violent passenger
6	premature childbirth	f	breathing problems
7	a heart attack	g	anaphylactic shock

2 Complete the sentences with an item from each box.

give	open up	~~stabilize~~	inject	struggling	go	restart

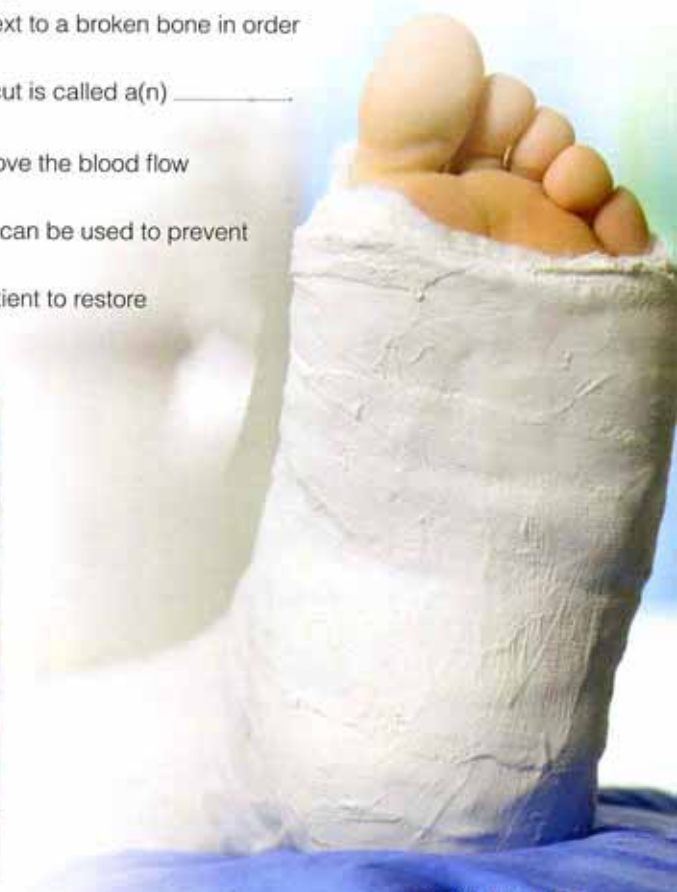
airways	labour	~~limb~~	CPR	breathe	insulin	heart

1 In the case of a broken leg, the first thing to do is stabilize the limb.
2 Women in late pregnancy are discouraged from flying in case they _____ into _____.
3 Diabetics have to _____ themselves with _____ to control their blood sugar levels.
4 Cabin crew are trained to _____ _____ in case of a heart attack.
5 A defibrillator can be used to _____ the _____ if it stops beating.
6 Asthma sufferers can carry an inhaler to _____ the _____ if they have an attack.
7 An oxygen mask will help a passenger who is _____ to _____.

3 Complete the sentences 1–10 with the words from the box.

adrenaline	antihistamine	aspirin	bandage	CPR	defibrillator	EpiPen	inhaler	plaster	splint

1 A(n) _____ is a long thin piece of cloth that you wrap around an injured part of your body.
2 Cabin crew are trained to give _____ in case of cardiac arrest.
3 A(n) _____ is a piece of metal, plastic, or wood that is put next to a broken bone in order to hold it in place.
4 A thin piece of cloth or plastic that sticks to your skin to cover a cut is called a(n) _____.
5 A(n) _____ is often used by asthma sufferers.
6 _____ is a drug that cures minor pain or that is used to improve the blood flow when a patient complains of chest pain.
7 _____ and _____ are administered using an _____ can be used to prevent anaphylactic shock.
8 A(n) _____ is a machine that gives an electric shock to a patient to restore normal heart rhythm.



FIRE

Section one – Fire risk

1 Work in pairs. Discuss the questions.

1 What do you think is the most common cause of fires on board planes?
2 What incidents caused by fire have you heard about?
3 What training have you received for dealing with fires?

2 You are going to read dangerous goods incident reports from the Australian Civil Aviation Authority. Read the stories, and match each incident with a story. Write A–H.

In which incident:

1 was fire started by metal touching metal? ___
2 did someone try to illegally ship explosive powder? ___
3 did the movement of the aircraft cause a fire? ___
4 did leakage cause a dangerous chemical reaction? ___
5 was a fire discovered after landing? ___
6 did heat from a chemical reaction start a fire? ___
7 did an explosion in the hold cause a plane to crash? ___
8 did a passenger accidentally bring a dangerous item on board? ___

DANGEROUS GOODS INCIDENTS REPORT

A On arriving at the destination, one passenger's bag had smoke coming out of it. A check by the airline revealed that a cigarette lighter had ignited and burned some of the clothing.

B An aircraft crashed due to a flammable liquid – possibly perfume – leaking in a passenger's stowed baggage. An ignition source set light to the liquid, causing an explosion.

C A courier driver arrived at a freight-forwarder's premises and asked to pick up a large crate which contained an explosive material in the form of a black powder. The owner knew it was prohibited, and was already in trouble with the police for collecting a briefcase full of fireworks from the airport two days earlier.

D Federal police were called to a baggage carousel at an international airport to check an unclaimed bag. An inspection of the contents revealed a fire extinguisher and a packet of sandwiches. It was finally discovered that a passenger had accidentally taken a taxi driver's bag from the car and didn't notice that he checked in an additional bag.

E A shipper consigned a wet-cell battery, undeclared as dangerous goods. Before consignment he emptied the acid out of the battery. But he also placed a brake cable in the same package. On arrival of the aircraft, smoke from the package set off a smoke detector because the brake cable had caused a short circuit of the terminals.

F In a cargo hangar, a container ignited. One item of cargo in the container was an oxygen generator, undeclared as dangerous goods. These devices produce oxygen by chemical reaction, which creates significant heat.

G Undeclared dangerous goods described as 'laundry products' contained a mixture of a chemical solution and corrosive solids. It was loaded on its side in the cargo compartment and the liquid leaked onto the solids, causing a very hot fire.

H While unloading baggage, ground staff noticed smoke rising from a suitcase. Investigation revealed that a quantity of matches had ignited due to vibration in the hold.

DANGER >>>> DANGER >>>>

3 Decide if the sentences are true or false. Write *T* or *F*. Then read the text again to check.

1 In incident A, the cigarette lighter caught fire first. ___
2 In incident B, a spark may have set the perfume alight. ___
3 In incident C, the courier driver had fireworks in his truck. ___
4 In incident D, the passenger was a taxi driver. ___
5 In incident E, the shipper hadn't taken any precautions. ___
6 In incident F, heat from the aircraft ignited oxygen. ___
7 In incident G, the goods were incorrectly loaded in the hold. ___
8 In incident H, ground staff immediately knew the cause of the fire. ___

Vocabulary – collocations related to fire

Match a word on the left with a word on the right to make collocations from the incident reports.

1	cigarette	a	circuit
2	fire	b	reaction
3	corrosive	c	liquid
4	ignition	d	extinguisher
5	chemical	e	solids
6	smoke	f	lighter
7	flammable	g	source
8	dangerous	h	material
9	explosive	i	goods
10	short	j	detector

Functional English – Obligation, prohibition and permission

1 01 Listen to a spokeswoman from the Australian CAA commenting on the dangerous goods reports. Underline the correct information.

1 *Many / Not many* passengers fly with dangerous goods by mistake.
2 Correctly-declared goods cause *hardly any / most* fires.
3 Airport staff should possibly be better trained in dealing with *fires / dangerous goods*.

2 01 Listen again and complete the sentences.

1 Most passengers know what they _____ and _____ bring into an airport.
2 It's obvious that you _____ bring anything explosive on board.
3 Although some people still try, even when they know it's _____.
4 The owner of the black powder knew he wasn't _____ transport it without declaring it as dangerous goods.
5 You _____ declare dangerous goods or you are _____.
6 It's difficult to understand, for example, how someone _____ chemical solutions and corrosive solids on board.

Speaking

Work in pairs. You are going to roleplay a customs official explaining rules about prohibited goods to a passenger. Student A look at p 105. Student B look at p 109.

Section two – Smoke-jumper

1 Below are some words and phrases for describing fires. Put each one into the correct column.

spread contain a fire extinguish a fire ~~set something on fire~~ ignite put out a fire
go out burn spray fire-retardant liquid smoulder catch fire explode

start	continue	stop
set something on fire		

2 Work in pairs. Look at the pictures. Tell the story. Use the words in exercise 1.

3 Work in pairs. Look at the photographs of the aerial fire service in action at the top of the page. Discuss the questions.

1 In what type of environment would they be needed?
2 How do they tackle fires from the air and on the ground?

4 02 Listen to a radio feature about an aerial fire service.
What are the jobs of the three people who talk to the radio presenter?

5 02 Listen again and underline the correct information.

1 This aerial fire service operates in *Mongolia / Siberia.*
2 Wild fires are usually caused by *natural phenomena / human activity.*
3 Wild fires start because *the forest is dry / people are careless.*
4 *Summer / Autumn* is the busiest time of year.
5 In order to make a safe drop, the pilot *sometimes has to make two or three circuits / must keep upwind of the fire.*
6 For the smoke-jumper, *extinguishing the fire / finding a way out of the forest* is the most difficult thing.

Functional English – Orders and requests

1 03 Complete the sentences from the radio feature, then listen and check.

1 _____ your full kit.
2 _____ for inspection.
3 _____ your work to us?
4 _____ us how fires are caused?
5 _____ about your work on the ground?
6 Jumpers, _____ talk! _____ ready ... drop zone!

2 Work in pairs. Discuss the questions.

1 Which sentences sound polite? Why?
2 Would you use similar expressions and intonation in your language to make a polite request?

3 03 Listen again and repeat the sentences.

4 We often use *get* in place of verbs of movement in orders. Make the following polite requests into orders with *get.*

1 Could you exit the runway, please? Get off the runway!
2 Would you bring me some water, please? _____
3 Could you move away from the aircraft, please? _____
4 Could you leave the aircraft as quickly as possible? _____
5 Can you find a fire extinguisher, please? _____
6 Would you put on your mask, please? _____

5 Work in groups. One student make a series of orders and polite requests in the same way. Other students obey polite requests, but not orders.

Speaking

Work in pairs. Discuss the questions.

1 Do you have an aerial firefighting service in your country? Why / Why not?
2 Would you like to work in aerial firefighting operations? Why / Why not?

Section three – On-board fire

1 Compete the sentences with the verbs below.

come loose	set off	reset	overheated	trips	short-circuit	overloaded

1 The fan has _____ – there's smoke coming from it.
2 If anyone smokes in the toilet, it will _____ the smoke detector.
3 This outlet is _____, so we need to unplug a couple of things.
4 Some wiring has _____ and needs securing in place.
5 Water has got into the wires and caused the system to _____.
6 If the circuit-breaker _____, you need to _____ it.

2 Work in small groups. When a fire is discovered during a flight, is it more important to fight the fire or land the plane? Why?

3 04,05,06 Listen to intra-cockpit and radio-telephony communications from a B747 in the cruise phase of flight. Tick (✔) the things that the crew do.

- put on their oxygen masks ☐
- inform air traffic control about the problem ☐
- investigate the cause of the fire ☐
- try to extinguish the fire ☐
- make an announcement to passengers ☐
- initiate an emergency descent ☐

4 04,05,06 Listen again and answer the questions.

1 How do the crew first realize there is a problem?
2 What does the pilot think the cause could be?
3 Where is the smell coming from?
4 How do they deal with the passengers who feel uncomfortable?
5 What two possible causes does the cabin crew manager mention?
6 What equipment does the cabin crew manager put on before investigating again?

Pronunciation – /l/ and /r/

1 07 Listen to six words. Write A or B, according to the word you hear.

	A	B	
1	right	light	___
2	fright	flight	___
3	frame	flame	___
4	wrong	long	___
5	road	load	___
6	arrive	alive	___

2 07 Listen again and repeat the words.

3 Work in pairs. Take turns to read one word from each line. The person listening must say if they hear A or B.

4 Now practise these sentences.

1 The right light is broken.
2 We had a fright when the flight landed heavily.
3 The flame came from the air frame.
4 The pilot flying took a wrong turn.
5 They'll transport the load by road.
6 All systems must be upgraded or replaced.
7 I was glad to arrive alive.
8 File the report on the fire.

Functional English – Identifying and responding to problems

Complete the extracts from the dialogue with the words below. Then listen and check.

1 05

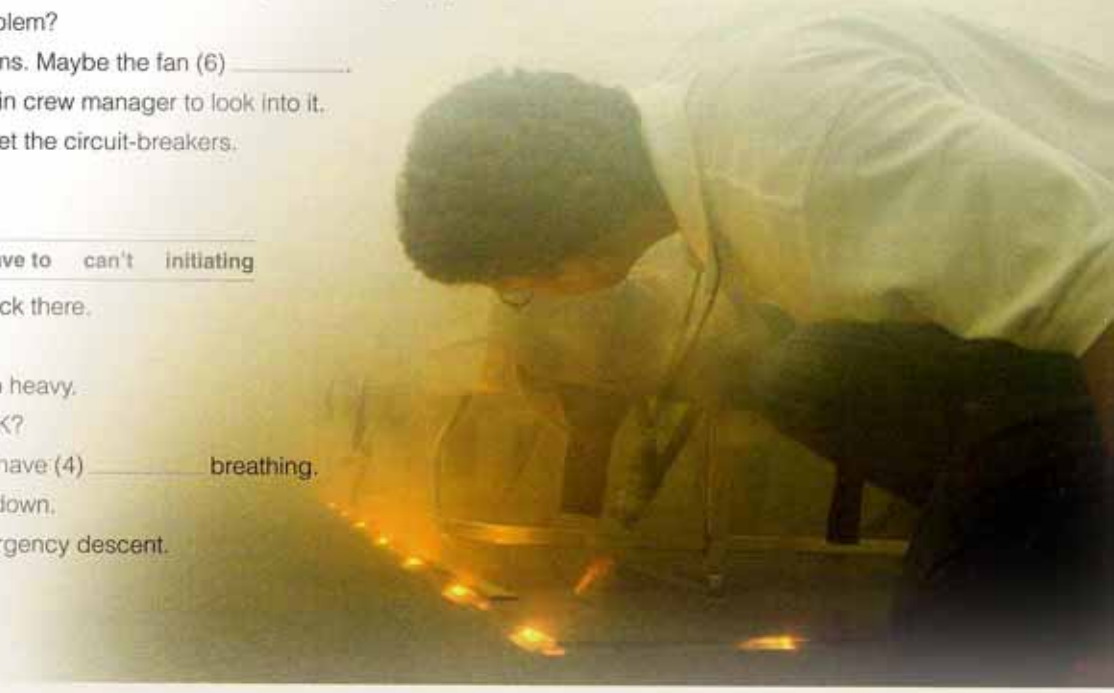
happened	I'll try	what	overheated	I'll ask	problem	where's	tripped

PF (1) _____ was that? This isn't right.
PNF What's (2) _____?
PF Three circuit-breakers have (3) _____. They're showing a (4) _____.
PNF (5) _____ the problem?
PF In one of the washrooms. Maybe the fan (6) _____.
PNF (7) _____ the cabin crew manager to look into it.
PF (8) _____ and reset the circuit-breakers.

2 06

trouble	why	smoke's	have to	can't	initiating

C I (1) _____ get back there.
PNF (2) _____ not?
C The (3) _____ too heavy.
PNF Are the passengers OK?
C People are starting to have (4) _____ breathing.
PNF We (5) _____ go down.
PF (6) _____ an emergency descent.



Speaking

1 The flow chart shows the pattern of communication in the two dialogues in the Functional English section. Complete the boxes with the appropriate statement. The first one has been done for you.

Say what the problem is

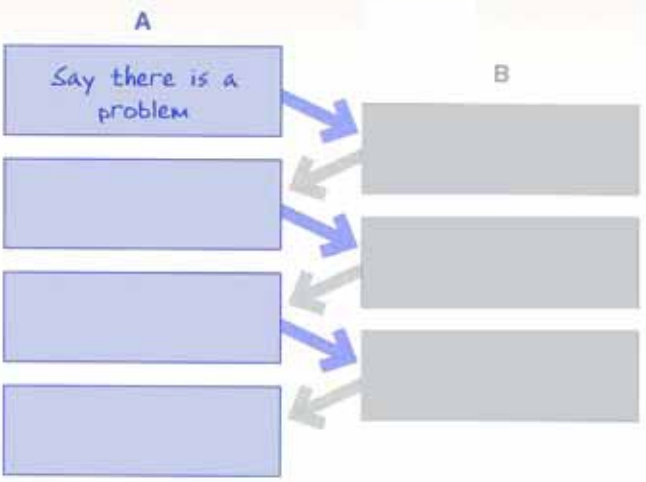
Announce action (x2)

Request clarification

~~Say there is a problem~~

Request further clarification

Give more information



2 Work in pairs. Use the prompts to make dialogues based on the flow chart pattern. Invent your own details.

1 There is a smell of burning plastic in the galley
2 The floor in business class feels hot.
3 There are sparks under the instrument panel.
4 There is smoke coming from a bag in an overhead locker.

Section four – Language development

Functional English – Obligation, prohibition and permission

1 Complete the sentences with the words and phrases in the box. In some cases, more than one answer is possible.

breaking the law	can and can't	have to	illegal	let
mustn't	not allowed	permitted	prohibited	required

1 It is _____ to smoke in the washroom.
2 Passengers are not _____ to enter the cockpit at any time.
3 You are _____ to leave your seat during take-off and landing.
4 Carrying anything explosive onto a plane is _____.
5 The cabin crew _____ inform passengers of safety procedures in the event of an accident at the beginning of every flight.
6 All passengers flying to and from the US are _____ to carry a machine-readable passport.
7 The man was not _____ on board because he appeared to be carrying suspicious goods in his hand luggage.
8 It is _____ to fly a plane without a license.
9 Hand luggage to be taken into the cabin _____ contain any dangerous or flammable items.
10 Flight regulations clearly state what passengers _____ bring onto a plane.

Functional English – Orders and requests

2 Rearrange the words to make orders.

1 immediately / fasten / passengers / seatbelts / tell / the / their / to
_____.
2 don't / hot / it / it's / so / touch / very
_____.
3 tell / severe / we / passenger / MedLink / have / and / burns / call / them / a / with
_____.
4 about / and / contact / emergency / problem / services / tell / the / the / them
_____.
5 engine / down / two / number / shut
_____.
6 aerodrome / inform / nearest / of / pilot / the / the
_____.
7 from / passengers / stop / the / the / using / washroom
_____.
8 as / as / get / of / out / plane / possible / quickly / the
_____.

3 Make the following orders into polite requests. use the verbs in brackets.

1 Get me some water! _____ (bring)
2 Quick! Get a fire extinguisher! _____ (find)
3 Get off the runway! _____ (exit)
4 Get your seatbelts on! _____ (fasten)
5 Get on your masks! _____ (put on)
6 Get ATC on the radio! _____ (contact)
7 Find the checklist for fire! _____ (look for)
8 Tell me more! _____ (give)
9 Don't bother the pilot! _____ (disturb)
10 Tell me where the nearest aerodrome is. _____ (let know)

Identifying and responding to problems

4 Find and correct the mistake in each sentence.

1 What ~~is~~ happened? has
2 Show me where is the problem? _____
3 What shall we doing about it? _____
4 Are OK the passengers? _____
5 I try and reset them. _____
6 I'll asking the cabin crew manager to look into it. _____
7 I'll contact ATC and declare for an emergency. _____
8 Let get the passengers' masks on. _____

Vocabulary – collocations related to fire

1 Match the beginnings with endings to make sentences.

1 The controllers alerted the ...
2 One of the tyres caught ...
3 It took eleven firefighters to contain ...
4 The flight attendant tried his best to extinguish ...
5 The pilots could see ...
6 The emergency fire service sprayed the empanage of the plane with ...
7 Two fire services were involved in attempting to tackle the ...
8 A passenger thought he could smell burning ...
9 There should be several fire ...
10 The flames completely ...

a blaze at San Francisco airport.
b plastic near his seat.
c engulfed the plane just seconds after everyone had been evacuated.
d the small fire in the washroom.
e extinguishers on every plane.
f fire on landing.
g the fire on the runway.
h smoke coming from under the cockpit door.
i emergency services as soon as they realized there was a problem.
j foam.

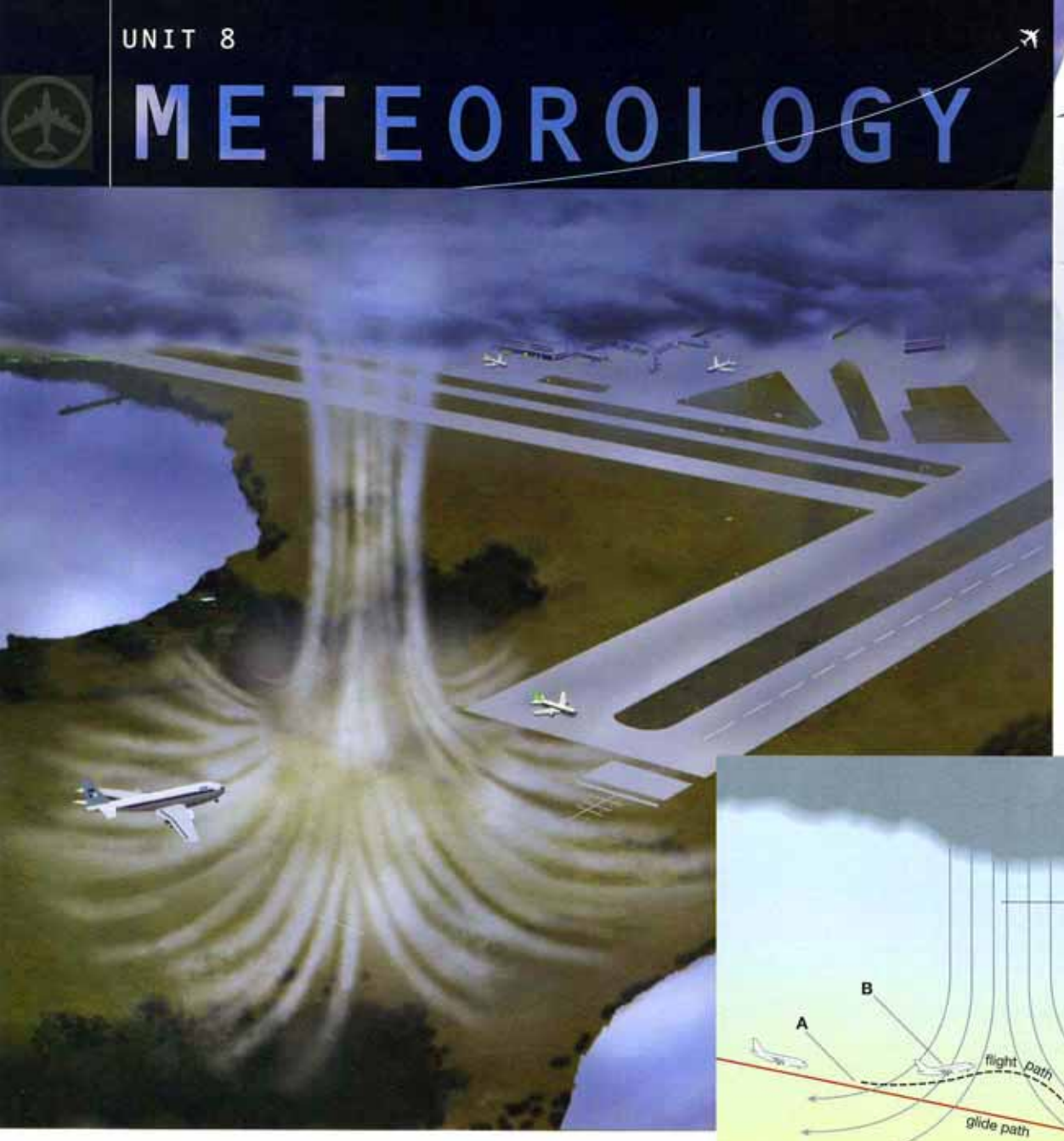
Vocabulary from the unit

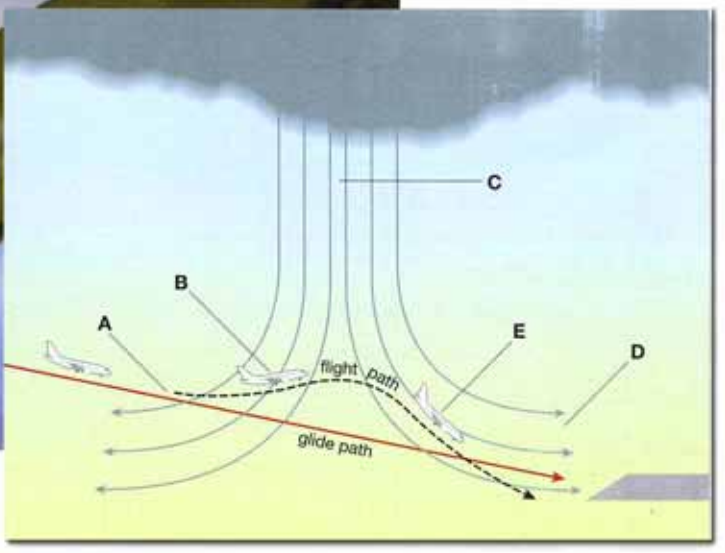
2 Rearrange the letters in the words from the unit to match the definitions.

1	**adeprs**	(of fire) to gradually affect a larger area
2	**est fof**	to cause something to operate or to explode
3	**delmorsu**	to burn slowly, producing smoke but no flames
4	**egiint**	to start to burn, or to make something start to burn
5	**horst cciirtu**	a bad electrical connection that prevents a piece of equipment from working
6	**efir gruinheetsix**	a foam-filled container that is used to put out a fire
7	**xegnoy akms**	an object that fits over your face and is used for helping you to breathe normally
8	**oehs**	a very long tube that water can flow through

UNIT 8

METEOROLOGY





Section one – Microburst

1 Match the descriptions below with letters A–E in the diagram.

1 Tailwind increases ___
2 The aircraft has increased lift ___
3 Headwind increases ___
4 The aircraft suddenly loses lift and air speed ___
5 A downdraft of cold air ___

2 Read the text and decide if the sentences are true or false. Write *T* or *F*.

1 Flight 191 landed on a short runway. ___
2 The problem was caused by fast-moving cold air. ___
3 Ted Fujida piloted a plane through a microburst. ___
4 American pilots found a method for surviving a microburst. ___

Microbursts – a battle against nature

As Delta Airlines Flight 191 approached Dallas-Fort Worth airport on a hot summer's day in 1985, it flew into a thunderstorm. The storm quickly got worse, and the crew noticed that something extremely strange was beginning to happen. At 800 ft, they suddenly began to lose control of the plane's speed, which increased to 173 kt without any throttle. Just as suddenly, the speed dropped to 119 kt, even though the pilot was applying full power. To prevent a stall, the pilot pushed the nose down. The plane could not gain height, and came down far short of the runway. The freak weather that brought down Flight 191 was a microburst. Millions of dollars have been spent on pilot training and detection systems to ensure that planes can now survive this dangerous phenomenon.

A microburst is essentially a shaft of fast-moving cold air that hits the earth from high up in the atmosphere, then explodes upwards and outwards. A low-flying plane encountering this would fly first into a strong headwind, then a downdraught, then a fierce tailwind, which forces it to lose height rapidly. A microburst is caused when a thunderstorm carries massive amounts of wet warm air high into the atmosphere on its strong updraughts. This air then cools and becomes heavier, causing it to plunge to earth.

The first person to suspect the existence of this phenomenon was a researcher called Ted Fujida, who was flying over a Siberian forest in 1972 when he observed how tens of thousands of trees had been blown down in a pattern radiating outwards from a single point. He knew that the cause could not be a massive tornado, as the crew said, because a tornado follows a path. Research into the phenomenon began, but progress was quite slow until the 80s, when research by NASA gave us an understanding of how microbursts are caused, and it was recognized that even a large aircraft could not survive them.

The survival technique that pilots are taught today was developed by two American pilots in the 1980s. The required action goes against natural instincts – apply full power and pull the nose up at least 15° until the stall warning is triggered, and then hold on through the turbulence. Without doubt, the insight and determination of the people who first recognized and studied microbursts thirty years ago has saved the lives of thousands of passengers.

3 Read the text again and answer the questions.

1. What effect did the microburst have on the speed of flight 191?
2. How did the crew try to avoid stalling the aircraft?
3. In your own words, how is a microburst formed?
4. What effects does a microburst have on a low-flying aircraft?
5. How did Ted Fujida know a tornado did not damage the forest?
6. How do pilots today deal with microbursts?

Functional English – Changing the strength of adjectives

We can use adverbs to make an adjective weaker or stronger.

... something **extremely** strange was beginning to happen.
... progress was **quite** slow ...

Or we can use an extreme adjective.

a **massive** tornado

1 Number these words or expressions from 1 (weakest) to 6 (strongest).

___ really / absolutely huge
___ quite / fairly / pretty big
___ huge
___ very / really big
___ not big at all
___ extremely big

2 Underline the best adjective to complete the sentances.

1. It's *very / absolutely* freezing in winter in Siberia, and you need a fur hat.
2. Libya is *extremely / not at all* hot for most of the year, which can cause overheating problems.
3. It gets *quite / extremely* cold at night, but the temperature never falls below freezing.
4. You get some *really / very* incredible storms in the mountains.
5. The runway can be *absolutely / pretty* slippery, even after the snow is cleared.

Speaking

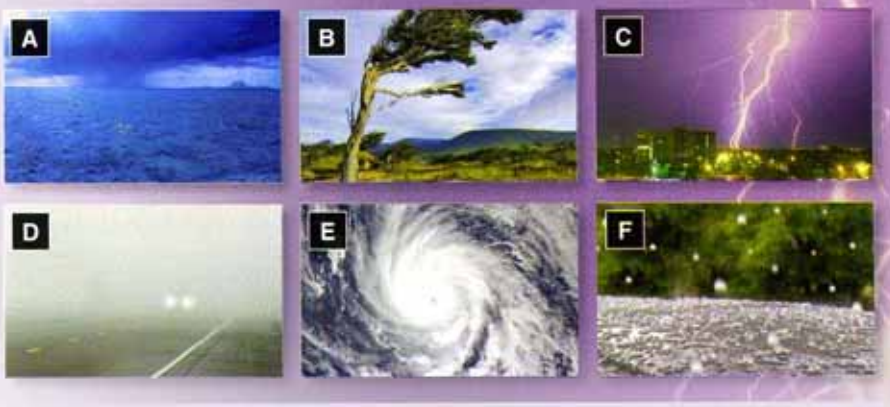
Work in groups. Talk about the most extreme weather conditions you have experienced. Talk about:

- when and where they happened
- how bad the weather was
- what happened
- what happened at the end of the story
- any developments / results of this.

Section two – Airport disruption

1 Match the words below with the pictures of weather conditions.

thunderstorm ___
gale ___
monsoon ___
fog ___
hurricane ___
hailstorm ___



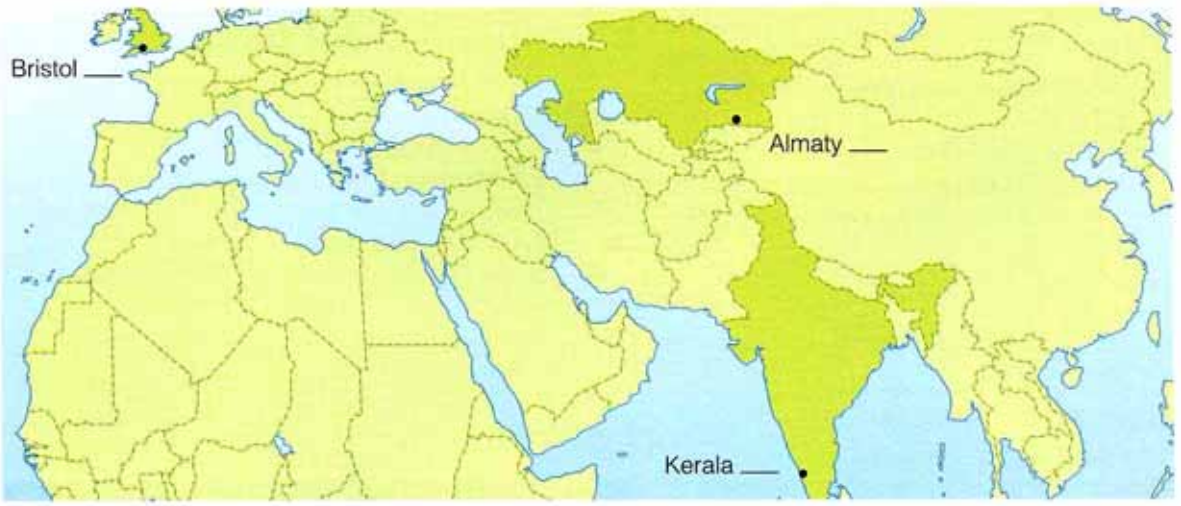
2 Work in pairs. Discuss which weather type(s) you could find in:

1 a tropical area
2 a northern coastal area
3 an inland area.

3 Match the words with the definitions.

1	visibility	a	(of a surface) difficult to move on because it is wet or smooth
2	slippery	b	used to describe weather that keeps changing
3	overcast	c	how far you can see, depending on weather conditions
4	sticky	d	used to describe weather that makes you feel hot and uncomfortable
5	unstable	e	completely cloudy, so that you cannot see the sun

4 08 Listen to four weather descriptions. Number the places on the map in the order you hear them.



5 08 Listen again and make notes to complete the chart.

	Bristol	Almaty	Kerala
Winter	overcast drizzle		
Summer			
Prevailing wind			
Warning			

Vocabulary – Weather words

Match the adjectives with the nouns that they describe.

good (×2) ~~humid~~ mild stormy (×2) rough smooth overcast clear strong light (×2) heavy poor freezing

1 weather conditions humid / _____ / _____ / _____
2 an approach _____ / _____
3 the sky _____ / _____ / _____
4 wind _____ / _____ / _____
5 rain _____ / _____
6 visibility _____ / _____

Functional English – Results and consequences

09 Listen and complete the sentences from the listening.

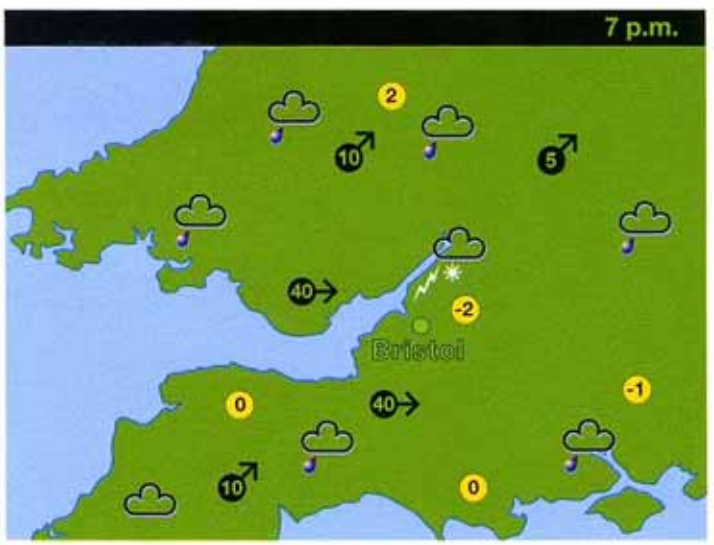
1 _____ of the warm Atlantic winds, the temperature remains quite high.
2 Aircraft usually depart on the south-west heading _____ prevailing south-westerly winds.
3 The airport operator has just resurfaced the runway, and _____ this sometimes there can be standing water.
4 This _____ quite long delays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

Listening – Weather forecast

1 Look at the weather forecast for Bristol. Discuss what effect the weather will have on flights into and out of Bristol over the next 12 hours. Try to use expressions from the exercise above.

2 10 Listen to a briefing from the ATC shift supervisor and underline the correct information.

1 Controllers working the *approach / departure* areas are going to be busy.
2 The *evening / night* shift is going to be quieter than the *evening / night* shift.
3 The *upper airspace / apron* is going to be very quiet over the next 12 hours.
4 It's going to be difficult for *westbound / eastbound* aircraft to fly into Bristol today.



Functional English – Asking someone to repeat information

1 11 Listen and complete the sentences.

1 I _____ the word before 'control positions'.
2 I _____ that last bit.
3 What _____ after 'morning shift'?
4 _____ the first part of the sentence?

2 Work in pairs. Take turns to read parts of listening script 08 on page 121, but occasionally whisper an important word so that your partner can't hear it. When you don't hear a word, use the expressions above to ask for repetition.

Speaking

Work in groups. Talk about the weather conditions at your airport and how your airport deals with extreme weather.

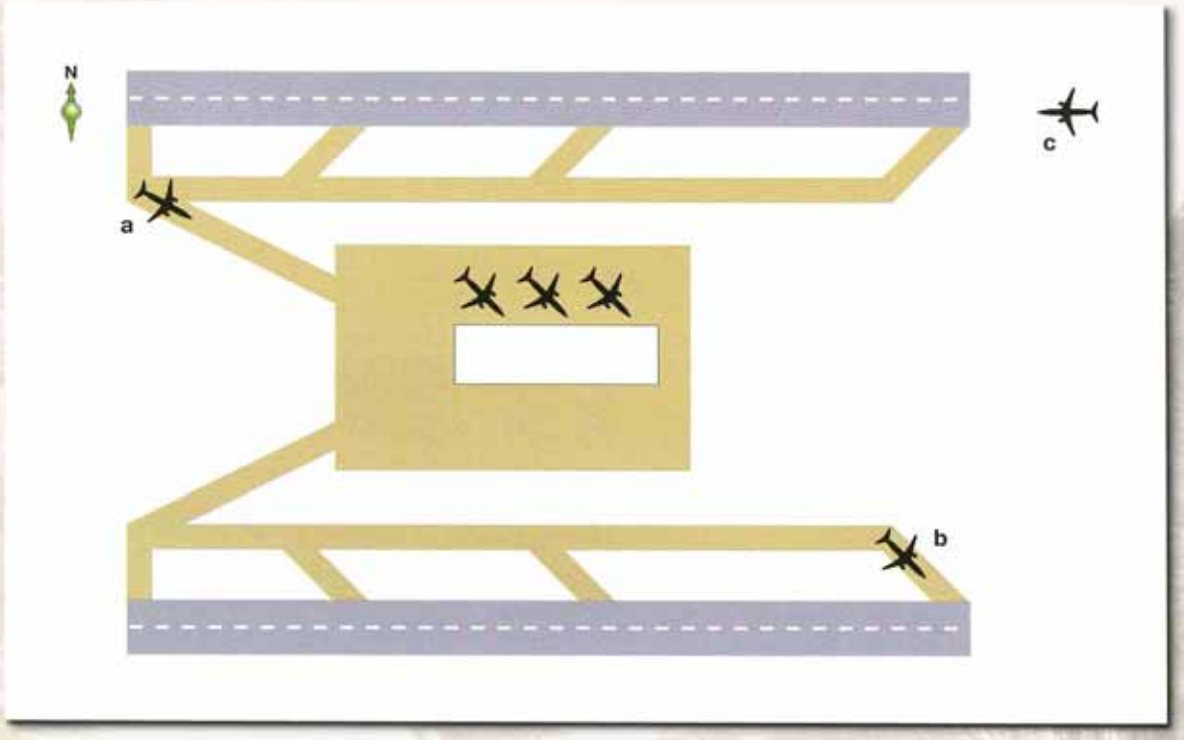
Section three – Stormy approach

1 Work in groups. Discuss the questions.

1 What is wind shear and why is it so dangerous for aircraft?
2 How can arriving and departing traffic avoid wind shear?
3 What experience of wind shear have you had?

2 12 Listen to the first part of the dialogue and match the call signs to aircraft A–C in the picture.

1 ES23 ___ 2 QA638 ___ 3 Company 737 ___



3 12 Listen again and underline the correct information.

1 The pilot of ES23 decides to *cancel the flight / take off / wait.*
2 QA638 sees the storm is *in front of / to the left of / behind* the airport.
3 The crew of QA638 requests a *pilot report / weather report / new flight path* from the tower.
4 The crew of Company 737 describes the landing conditions as *rough / smooth / bumpy in places.*

4 13,14 Listen to the second part of the dialogue and decide if the statements are true or false. Write *T* or *F*.

1 The threshold wind speed is decreasing. ___
2 Wind direction varies between 270° and 250°. ___
3 Visibility is getting worse. ___
4 The tower controller issues a microburst alert with a speed loss of 30 kt. ___
5 QA638 loses 20 kt on short final. ___
6 The pilot decides to fly through the turbulence and land. ___

Functional English – Warnings

1 14 Listen again to a short section of the dialogue. Complete the expressions.

1 _____ wind shear.
2 _____ any microburst activity.
3 _____ on short final.
4 _____ microburst activity.

We use *be on the alert / watch out / look out (for something)* and *be careful (of something)* to warn someone about possible danger.

2 Work in pairs. Write a short dialogue between pilot and ATC, or pilot and co-pilot, including the four expressions above. Then perform it to the group.

Pronunciation – /ʃ/, /ʒ/, /tʃ/, /dʒ/

1 15 Listen to how we say these sounds. Listen and repeat the words.

2 Put the words into the correct column in the table according to the underlined sounds.

approach **edge** **measure** **switch** **threshold** **emergency** **usual** **shear**

/ʃ/	/ʒ/	/tʃ/	/dʒ/
short	visual	watch	roger

3 16 Listen and check your answers. Then listen again and repeat the words.

Speaking

1 Work in pairs. Student A is the pilot of HotAir 220 coming to land at Kerala airport, India. Student B is the approach ATC. Read the conversation outline and decide what to say.

Pilot	ATC
Announce approach to Kerala airport	
	Acknowledge and warn of bad weather conditions
Acknowledge and ask what the conditions are	
	Inform pilot of possibility of monsoon rains
Acknowledge and ask if you may proceed to landing	
	Confirm and warn of approaching storm clouds
Confirm understanding	
	Inform pilot monsoon rain has occured and runway has flooded. Tell pilot to divert

2 Roleplay the dialogue, then change roles and do it again.

Section four – Language development

Functional English – Changing the strength of adjectives

1 Complete the table with the correct synonyms from the box.

absolutely enormous entirely exceptionally extremely fairly huge
massive minute pretty really relatively slight tiny totally

small	big	quite	very	completely

Results and consequences

2 Match the beginnings with the endings to make sentences.

1 There was a thunderstorm overhead, **so** ...
2 **Because of** the strong turbulence, ...
3 And it is **for this reason** ...
4 The runway is particularly slippery. You should **therefore** ...
5 **As a result of** strong gales, ...
6 Wing stall is a common **consequence** ...
7 The sky was dull and overcast. The pilot **consequently** ...
8 The wind shear during the thunderstorm **resulted in** ...
9 The foggy conditions **led to** ...
10 One of the wings of the plane had not been de-iced and the pilot **subsequently** ...

a cancelled her VFR flight.
b flights were diverted to an alternative airport.
c lost control of the plane.
d expect longer stopping distances.
e of ice accretion from freezing drizzle.
f passengers were told to fasten their safety belts.
g reduced visibility near the airport runway.
h some very severe turbulence.
i several hangars had to be repaired.
j that we have decided to suspend two members of ground control.

Asking someone to repeat information

3 Rearrange the words to make sentences.

1 catch / didn't / first / I / of / part / the / the / sentence

2 that / get / I / didn't

3 bit / can / last / repeat / that / you ?

4 after / did / 'hailstorm' / say / what / you ?

5 that / was / said / word / what / before / the / you / 'conditions'?

6 catch / didn't / I / I'm / that / sorry

Warnings

4 Underline the correct option.

1 *Be prepared to / Be on the alert for* wind shear when approaching the edge of the city.
2 *Watch out for / Pay attention* microburst activity near runway 27L.
3 We were told to *look out for / listen carefully* any light aircraft caught in the storm.
4 Please *be careful of / be ready* the slippery runway on landing.
5 You will need to be particularly *beware of / vigilant* when flying near the mountains.
6 Please *be prepared to / be on alert for* review your current flight plan because of the hurricane.
7 And on landing you will need to *be ready to / prepare for* a longer stopping distance due to the surface rain.
8 I want you to *beware of / listen carefully* as I read through the emergency procedure.
9 He didn't *pay attention to / on alert for* the warning about severe thunder and lightning.
10 *Watch out / Beware of* the strong winds at the end of the runway.

Vocabulary – Weather words

1 Match the adjectives 1–9 with their opposites a–i.

1 wet	a smooth
2 warm	b darkness
3 overcast	c dry
4 bright	d cool
5 heavy	e headwind
6 freezing	f light
7 rough	g scorching
8 tailwind	h clear
9 sunlight	i dull

Vocabulary from the unit

2 Rearrange the letters to match the definitions.

1	**abckl iec**	an invisible slippery surface than can form on the runway in cold weather
2	**bpumy**	(used about a flight) uncomfortable because of bad weather
3	**wde**	small drops of water that form on the ground at night
4	**dehnrtu**	the loud noise that you sometimes hear in the sky during a storm
5	**zdeirlz**	very light rain
6	**osrtf**	a thin white layer of powdery ice that forms on things outside when the weather is very cold
7	**aegl**	a very strong wind
8	**aehilnost**	a small ball of ice that falls as rain
9	**gghiilnnt**	the bright flashes of light that you see in the sky during a storm
10	**tesel**	a mixture of snow and rain
11	**yeilprps**	a surface that is difficult to move on because it is smooth or wet
12	**hlssu**	snow that is starting to melt on the ground

UNIT 9

LANDINGS

Section one – Touchdown

1 Work in groups. Look at the pictures. Where do you think the pictures were taken?

2 Make a list of the problems fixed-wing aircraft could have on approach and landing. Think about:

- terrain
- obstacles
- manouevres
- runway length
- weather

3 Read the exchanges about difficult landings from a pilot's Internet forum and match the airports with the pictures. Do they mention any problems from your list in 1?

http://www.pilotforum.org

14th July 2008, 11.19

SUPERMAN CVF is the only place I know where you can fly a bad weather low-level circuit BELOW the control tower! In an afternoon landing in winter, the sun is so low that from turning finals at two miles to just before touchdown, it's absolutely impossible to see in front of you. You can't go around because there is a mountain in the way. On short final, the runway looks too short and it looks like you're going to hit the mountain, but because part of the runway is at a +18.5% gradient, you have to ADD power to roll out. If the aeroplane stops, you won't get to the apron without someone getting out and pushing.

14th July 2008, 14.16

JETHEAD747 The 05 instrument approach at SXM is a VOR / DME but it's usually a visual. You can't touch down later than the touchdown zone because you only have a short 7,054 ft for roll-out. Slowing down and cooling is an operational issue. We had to go around once because an aircraft's brakes overheated and seized and it got stuck on the runway. On departure you backtrack onto the runway, do a 180. Right behind the aircraft there is a fence and a beach. There are always people standing near the fence and several have been blown back into the sea by jet blast.

14th July 2008, 14.55

BULLDOG The famous HKG runway one-three procedure was incredible. The fun started once eastbound on approach. First you got the view of the city and the skyscrapers. Then the giant red and white squares on the mountainside. You extended the gear as you closed with this marker. Just as it seemed like you were going to fly into the marker, you turned hard right, banking a full 47.5°. You turned so close to the buildings that you could see the people inside. It looked as if you could reach in and change the TV channel. 30 seconds later it was rudders neutral, you flared, and the undercarriage touched down, kissing solid ground. Unforgettable!

14th July 2008, 14.55

LORD LUCAN TGU is situated in a basin between mountains, and if you land on runway 01, you circle inside the basin, below the mountaintops. You have to bank hard, and you can look the opposite way and still see trees and mountains. On final you only have 100–200 ft to line up before touchdown. 01 has a displaced threshold, leaving a limited 5,436 ft of useable pavement. There's also a 1.06° downhill slope and a cliff, which is only 100 ft from the end of the runway. It always looks as though you're going to fall off the end of the runway! It used to be even more exciting before they removed a small mountain on the approach path and added traffic lights on Boulevard Hacia Loarque to stop traffic for each arrival or departure.

4 Read the text again. Answer the questions. Put a tick (✔) in the table.

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

5 Can you remember what these numbers refer to?

1 47.5° 2 100 ft 3 7,054 ft 4 +18.5% 5 180° 6 100–200 ft

6 Work in pairs. Describe the approach and landing at an aerodrome you know well. What are the interesting features?

Vocabulary – Landing gear and braking

Decide if the words are related to arrival, departure or gear / brake problems.Write *A*, *D* or *G/B* next to each one.

roll out ___ rotate ___ overheat ___ extend ___ flare ___ touch down ___
lock ___ seize ___ retract ___ collapse ___ get stuck ___ line up ___

Functional English – Describing sensory impressions

1 Look back at the pilot's Internet forum and complete the sentences.

1 On short final, the runway _____ too short and it _____ you're going to hit the mountain.
2 Just as it _____ you were going to fly into the marker, you turned hard right.
3 It _____ you could reach in and change the TV channel.
4 It always _____ you're going to fall off the end of the runway!

2 Work in pairs. Student A, describe what you thnk is happening in the four pictures below. Try to use the expressions from 1. Student B, look at the complete pictures on p 109. Listen to Student A's ideas first, then tell them if they were correct.

Student A



3 Change roles. Student B look at the pictures below. Student A look at the complete pictures on p 105.

Student B




Speaking

Work in small groups. Discuss what experience you have had of landing gear or braking problems.

Section two – Letting down a VIP

1 What special arrangements have to be made when transporting the following VIPs in your country?

- government representatives
- members of the royal family
- celebrities

Think about:

- security
- personal / private aircraft
- media
- diplomatic clearance.

2 17 Listen to a helicopter pilot talking about the time he carried a VIP, and answer the questions.

1 From where to where did the pilot have to carry the VIP?
2 Who was the VIP?
3 What caused problems with the journey?

3 17 Listen again and underline the correct information.

1 The helicopter landed *by / behind* the house.
2 The journey was about *five / ten* miles.
3 The pilot called the ship *after / before* they were airborne.
4 The ship lost the helicopter on the radar *¼ / ¾* of a mile out.
5 The pilot went around because he *lost communication with the ship / couldn't see.*
6 The VIP *knew nothing about flying / was an experienced flyer.*
7 Flying at 100 ft above the water is *risky / not risky.*
8 The outline of the ship was visible at *150 / 100* ft.

Functional English – Describing 3-D position and movement

1 Complete the sentences from the description of the VIP's journey using the prepositions in the box.

around below over into out onto under through

1 We went _____ the top of the cliffs ready to let down.
2 The best way to get _____ ship …
3 We went _____ the fog.
4 It's difficult to continue visually _____ fog.
5 I decided that we would go _____ the ship.
6 One of the options was to let down a little bit early to get down _____ the fog.
7 So I let down a little bit more, and came _____ from _____ the fog.

2 17 Listen again and check.

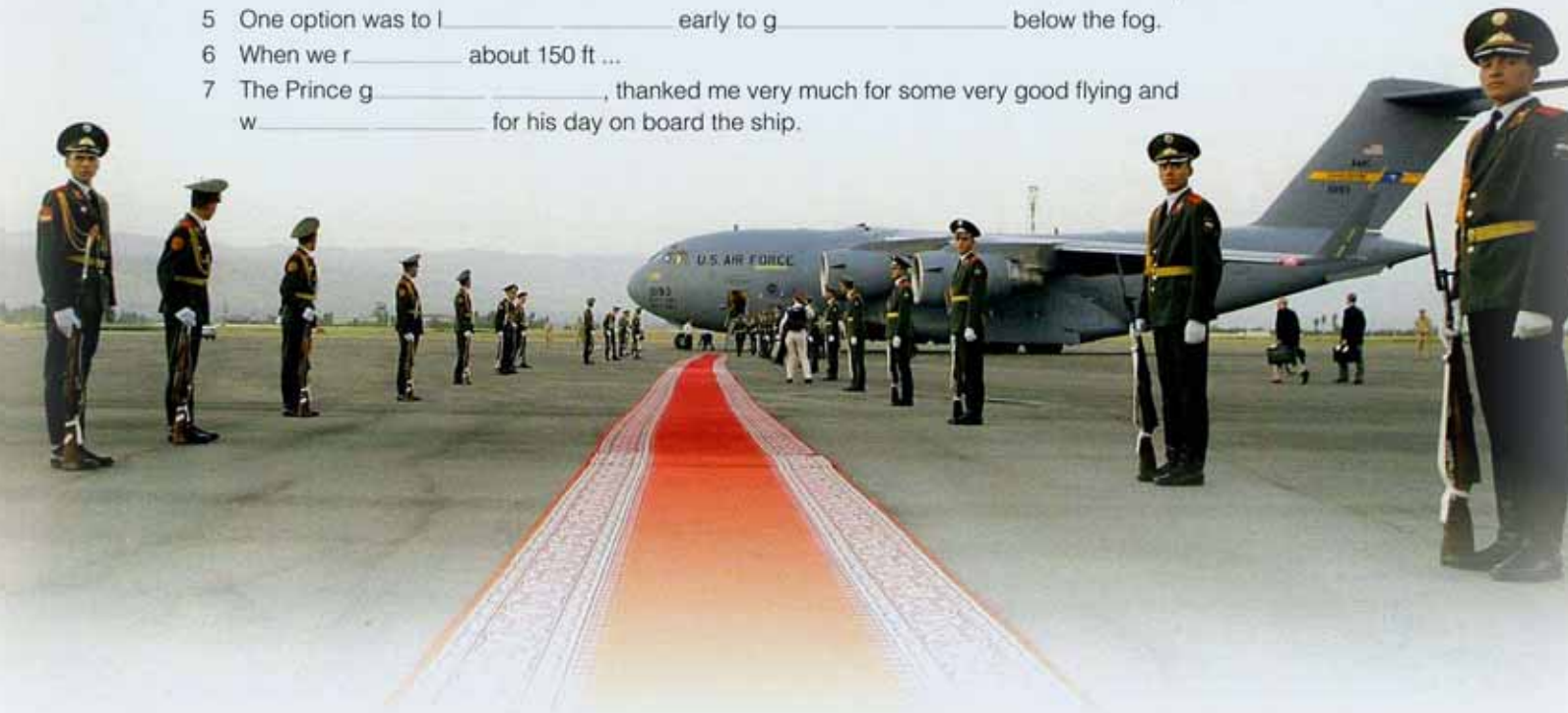
3 Work in pairs to describe your helicopter route to your partner. Student A go to page 106. Student B go to page 110.

4 Work in pairs. Describe the last flight you made or took using as many of the words from the box in 1 as you can.

Vocabulary – Verbs of movement

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

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



Pronunciation – Consonant clusters 2

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

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

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

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

3 19 Listen and repeat the words.

Speaking

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

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

Section three – Undercarriage

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

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

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

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

20,21

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

22

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

23,24

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

Functional English – Resolving misunderstanding

1 Listen again and complete the dialogues.

1 21

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

2 22

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

3 24

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

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

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

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

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

Student A

A Flight SQ286 taxied to runway 05L at Sydney's International Airport and was cleared for take-off. When the captain rotated the B747-412 for lift-off, the tail struck the runway and scraped for 490 m until the aeroplane became airborne. The tail strike occurred because the rotation speed was 35 kt less than the 163 kt required for the aeroplane weight.

B The controller cleared Flight 504 for a visual approach to runway 15. At 09:54 the crew reported on finals and were cleared to land. The Cessna Citation touched down 45 m short of runway 15 and struck the edge of the runway threshold. It continued for 112 m before coming off the runway. It ran another 263 m before it skidded into the wall of a building and stopped.

C Flight 1455, a B737-300, was vectored for a visual approach to runway 8. The flight's descent angle was more than 6°. Touchdown speed was 182 kt. The crew couldn't stop the aircraft on the runway and it overran. It crashed through the perimeter fence at a speed of 32 kt and stopped in a lake. The forward service-door escape slide inflated inside the plane and the nose gear collapsed.

Speaking

Discuss the questions in pairs.

1 When was the last time you had to resolve a misunderstanding at work? What exactly happened?

2 Have you ever been in a situation where either:
   a it was impossible to understand someone else?
   b someone found it impossible to understand you?

3 Discuss whether you agree or disagree with the statements below. Give your reasons.
   1 Most misunderstandings happen because pilots and ATCs do not use the radio or mic correctly.
   2 The only communication strategy needed to resolve misunderstanding is the phrase 'say again'.

Section four – Language development

Functional English – Describing sensory impressions

1 Match the beginnings and endings of the sentences.

1 The plane **looks** ...
2 This is your captain speaking. I'm afraid it **looks like** ...
3 Dumping the fuel **seemed like** ...
4 It **felt as if** ...
5 It doesn't **look as though** the passenger ...
6 The fog **appears to** ...
7 The flight attendant **gave the impression that** ...
8 The controller **sounds like** ...
9 The passenger **looks as if** ...
10 The pilot **sounds** ...

a she has a lot of traffic to deal with at the moment.
b be lifting.
c damaged.
d he is going to pass out.
e relaxed and in control.
f we may have to divert to another airport.
g a good idea at the time.
h is going to calm down.
i the right wing was heavier than the left.
j there might be a problem with one of the passengers.

Describing 3-D position and movement

2 Complete the sentences with words from the box.

like as looks seems though appears impression sounds

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

3 Underline the correct alternative.

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

Resolving misunderstanding

4 Rearrange the words to make sentences.

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

Vocabulary – Landing gear and braking

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

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

Other uses of prepositions

2 Complete the sentences with a suitable preposition.

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

FUEL

Section one – Aviation and global warming

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

1	air	a	change
2	carbon	b	layer
3	climate	c	emissions
4	CO_2	d	gases
5	greenhouse	e	dioxide
6	the ozone	f	pollution

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

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

1 the European Commission *yes / no*

2 the International Air Transport Association (IATA) *yes / no*

3 the European Federation for Transport and Environment (T & E) *yes / no*

Myth or reality?

Aviation and global warming

With air traffic and greenhouse gas emissions growing steadily, the European Commission has suggested limiting CO_2 emissions for all planes departing from EU airports. It stated that uncontrolled aviation growth cannot be allowed to continue.

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

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

1 Air transport contributes only 2% of global CO_2 emissions.
2 Over the last 40 years, emissions per passenger kilometre have decreased by 70%.
3 Airline fuel-efficiency has improved by 20% in the last decade.
4 80% of aviation emissions are related to flights over 1,500 km for which there is no alternative mode of transport.

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

1 The 2% figure refers only to CO_2 emissions, not other climate impacts such as aviation-induced cirrus clouds.
2 The 2% figure is from 1992, which fails to include the explosion in growth of global aviation in the last 15 years.
3 The true global contribution to climate change of aviation is between 4 and 9%, depending on the impact of aviation-induced cirrus clouds.
4 Aircraft fuel efficiency has not improved at all. Typical passenger aircraft of the 1950s were as fuel-efficient as typical modern jets.

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

1 We must limit the growth of aviation. EC
2 Most CO_2 emissions are caused by long flights. ___
3 Air transport is responsible for up to 9% of the human effect on climate. ___
4 Air traffic is responsible for under 5% of CO_2 emissions. ___
5 We need to consider the effect of cirrus clouds caused by emissions. ___
6 Fuel-efficiency is not improving fast enough to reduce pollution. ___
7 CO_2 emissions are 70% lower than 40 years ago. ___
8 Planes are no more fuel-efficient than they were 50 years ago. ___

Vocabulary – Prefixes

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

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

dis-	in-	un-

Functional English – Suggesting solutions to problems

1 Work in pairs. What can we do to reduce air pollution from aviation? List your points.

2 Read the text. Does it mention any of the same points that you listed?

3 Read the text again and underline the expressions for suggesting solutions.

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

Speaking

1 Work in small groups. Try to use the language you underlined above. What can we do about the following problems:

- noise pollution from airports
- dealing with airport waste
- water pollution from de-icing
- destruction of landscape and wildlife habitats by new airport building?

2 Work in small groups. How can the following people or organizations maximize fuel efficiency in aviation?

- ATC
- pilots
- aircraft operators
- aircraft designers

Section two – Gimli glider

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

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

2 Work in pairs. Discuss the following questions.

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

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

Boeing 767 makes emergency landing after hole in fuel tank

Canadian flight diverted for refuelling

Silent flight crash-lands at sports event

Canadian Air Force tests Boeing 767's gliding potential

Busy runway used for go-carting

4 25,26 Listen again and answer the questions.

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

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

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

Pronunciation – Information groups

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

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

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

3 26 Listen and compare.

Speaking

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

beach ___
football pitch ___
forest ___
frozen lake ___
golf course ___
marshland ___
highway ___
river ___
rough farmland ___
sea ___

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

Section three – Fuel icing

1 What are the main problems for aircraft flying in extremely low temperatures?

2 27 Listen to the incident and answer the questions.

1 What can you say about the weather conditions?
2 What happens to the flight as it enters the control tower's airspace?
3 What happens in the end?

3 27 Listen again and underline the correct information.

1 Fuel flow is *lower / higher* than it should be.
2 The reading of torque pressure should be *40 / 100*.
3 The pilots request *fire, crash, rescue services / vectors* from the control tower.
4 There are *22 / 122* people on board.
5 The pilots land *on a river / in a field.*
6 *Nine / No* people are injured after the landing of the plane.

Functional English – Expressing expectation

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

Fuel flow is very low. It ***should be*** *much higher.*
*You'****re supposed to be*** *on final now. Are you OK?*
Torque pressure ***is meant to be*** *at one hundred, not forty.*

1 Complete the sentences using *should, be supposed to, be meant to* in the correct form.

1 The temperature is high but
it should be much lower (should).
2 The fuel flow is low but
_____ (should).
3 The light is on but
_____ (should not).
4 The landing gear is down but
_____ (not supposed).
5 The supply is still on but
_____ (meant).
6 The torque pressure is at 40 but
_____ (meant).
7 They don't have enough fuel but
_____ (should).
8 They're not on final but
_____ (supposed).
9 The warning lights are flashing but
_____ (not meant).

2 Work in pairs. Make a list of rules or procedures that are not always followed correctly. Try to use the language from 1.
Then compare your list with the rest of the group.

Pronunciation – Long and short vowel sounds

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

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

2 28 Listen again and repeat the words.

3 Work in pairs. Take turns to read one word from each line. The person listening must say if they hear A or B.

Speaking

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

Student A

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

ENGINE POWER LOSS DURING FLIGHT

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

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

Section four – Language development

Functional English – Suggesting solutions to problems

1 Rearrange the words to make sentences.

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

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

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

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

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

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

Expressing expectation

2 Underline the best alternative in sentences 1–10.

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

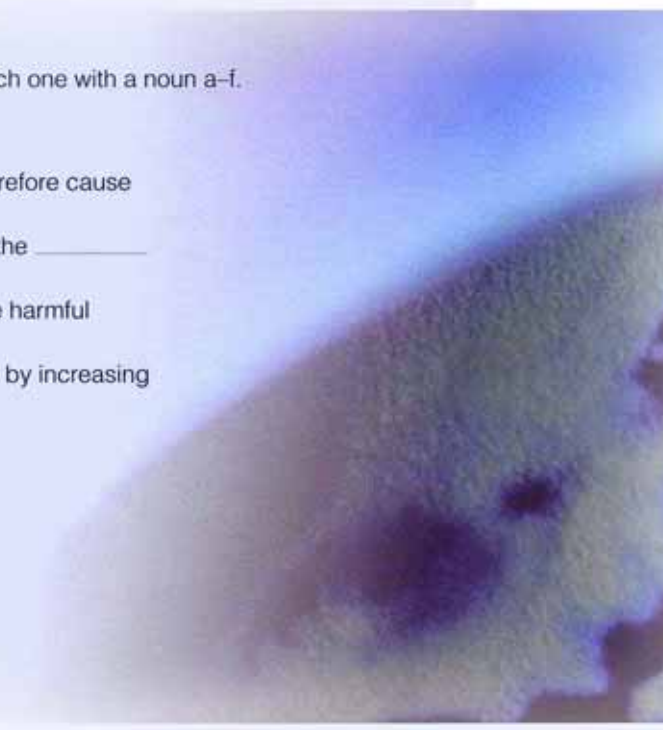
Vocabulary – Climate change

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

substances breathe escaping rise atmosphere protects

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

a carbon dioxide
b ozone layer
c global warming
d greenhouse gases
e air pollution
f CO_2 emissions



Prefixes

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

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

perform	crowded	operative	powered	ice
start	realistic	used	normal	atlantic

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

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

in-	mis-	over-	~~re-~~	under-

~~set~~	informed	accurate	estimated	fuel
efficient	diagnosed	weight	consider	

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

Nouns for fuel

4 Rearrange the letters to form the missing words.

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

Missing verbs

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

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

Pete

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

Chris

Hi Chris

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

Pete

PRESSURE

Section one – Blast

1 Work in groups. Talk about any incidents of rapid decompression you have heard about.

2 Read the story and decide if the sentences are true or false. Write *T* or *F*.

1 The co-pilot saved the captain from being sucked out of the plane. ___
2 The co-pilot tried to stop the plane dropping. ___
3 They didn't have time to dump fuel. ___
4 The pilot was unconscious during the incident. ___

Hanging on to life

Explosive decompression at 17,000 ft

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

The front windscreen had blown away and Tim, the captain, was being sucked out. I jumped across the cockpit and grabbed his waist. His body was outside the aircraft, bent over the top and his legs had stuck under the controls, disabling the autopilot. I could feel I was about to be sucked out myself when the chief steward, John, wrapped the captain's shoulder strap around me. The co-pilot, Alistair, was fortunately still strapped in his seat.

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

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

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

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

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

3 Complete the table.

Name	position
Nigel	steward
	chief steward
Alistair	
Tim	

4 Work in pairs. Answer the questions.

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

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

1 13 minutes
2 17,000 ft
3 2 minutes
4 11,000 ft
5 1,800 m
6 18 minutes

Vocabulary – Action verbs

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

suck drop blow hang jump grab wrap bang rush

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

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

Functional English – Expressing time and duration

1 Complete the sentences from the text.

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

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

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

Speaking

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

Section two – Damage

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

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

Write *W*, *F* or *L* next to each word.

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

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

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

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

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

4 Circle the correct answer.

1 What does the trainer think about the tiny crack incident?
   a They could have continued their flight.
   b The best thing to do was to wait for the windshield to be replaced.

2 Why did the rear cargo door blow off the DC-10?
   a The lock on the door was not working properly.
   b The door hadn't been closed properly.

3 What happened to the Boeing 737 on landing?
   a The nose gear worked correctly.
   b The nose gear buckled and caused more damage.

4 What happened when the Boeing 767 was damaged by a flock of birds?
   a The crew landed the plane.
   b The captain was injured.

5 What does the trainer say about the efficiency of cabin simulators?
   a A cabin simulator is ideal for practising emergency situations.
   b A cabin simulator is not really the same as a real emergency situation.

Functional English – Summarizing

1 29 Listen to the first part of the workshop and choose the best summary of the Boeing 737 incident.

a There was a sudden depressurization problem and a member of the cabin crew was killed.
b Metal fatigue can cause severe damage, causing danger of explosive decompression.
c A section of fuselage was torn from a Boeing 737 due to corrosion and metal fatigue, causing rapid decompression. One person died in the incident but the crew landed safely.
d When a large section of fuselage is lost, the cabin depressurizes immediately, and passengers and crew may be sucked from the aircraft.
e A Boeing 737 lost 35 m^2 of fuselage. It lost all electrics, communication lines and power supply. The airframe buckled and the nose dropped down. Fortunately, the landing gear worked correctly.
f In April 1998, a large section of upper fuselage tore away from a Boeing 737. One member of the cabin crew was sucked from the aircraft and died.
g A section of fuselage was torn away, but the plane landed safely.

2 30 Now listen again to the rest of the extract. Make notes on the other incident described.

3 Write a summary of the incident, then compare your summary with another student's.

Pronunciation – Diphthongs

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

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

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

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

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

/aɪ/	/eɪ/	/ɔɪ/	/ɪə/	/əʊ/	/aʊ/	/eə/

Speaking

Work in pairs. Discuss the questions.

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

Section three – Emergency descent

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

2 32 Listen to the dialogue and answer the questions.

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

3 32 Listen again and underline the correct information.

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

Pronunciation – Contrastive stress

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

*Not **fif**ty minutes – fif**teen** minutes.*

Underline the sections of words that should be stressed.

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

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

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

Functional English – Expressing consequences

1 34 Complete the sentences from the dialogue.

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

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

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

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

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

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

Speaking

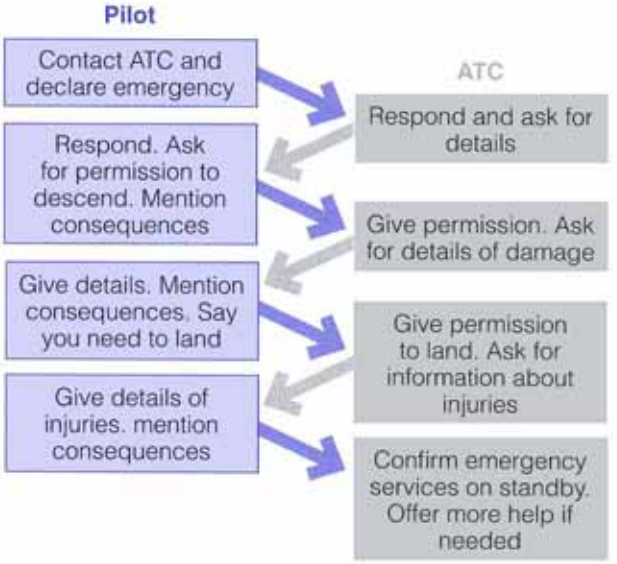
Work in pairs. You are going to roleplay an emergency situation. Student A is the pilot. Student B is the ATC. Use the chart and the information below to help you. When you have finished situation 1, swap roles.

Situation 1 – Student A

Call sign: TW430
Incident: bird strike → smashed windshield → sudden decompression.
Damage: to control panel and leading edges
Injuries: co-pilot badly cut and one passenger with serious head injury

Situation 2 – Student B

Call sign: BX711
Incident: hole in fuselage caused by unknown object → sudden decompression.
Damage: to left-hand horizontal stabilizer
Injuries: several passengers unconscious, one not breathing



Section four – Language development

Functional English – Expressing time and duration

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

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

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

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

have | lose | make | manage | run out of | spend | take | waste

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

Expressing consequences

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

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

Articles

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

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

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

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

Vocabulary – Action verbs

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

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

Verbs describing damage

2 Complete the sentences using words from the box.

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

1 The rear cargo door _____.
2 The door tore away a spoiler and _____ the tailplane.
3 The aircraft had _____ due to operating in a salty environment, and it was a very old aircraft with serious _____.
4 Almost 35 m^2 of metal _____ the upper part of the fuselage, _____ the electrics.
5 The lower part of the airframe _____.
6 A flock of birds _____ the aircraft nose, fuselage and wing leading edges, and _____ the aircraft skin eleven times.
7 One of the birds _____ into the cockpit and _____ the captain's instrument panel.

UNIT 12

SECURITY

Section one – Air rage

1 Work in pairs. Discuss the question.

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

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

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

A

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

B

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

C

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

D

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

3 Read the texts again. In which story:

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

Vocabulary – Conflict and restraint

Match the beginnings with the endings to make sentences.

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

Functional English – Focusing on actions

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

The woman **was taken** to hospital by ambulance after the plane landed.
He had to **be restrained** with plasticuffs by fellow passengers.
Massa **was jailed** for twelve months.
Two members of the crew **were bitten** as they restrained her.
The men **were removed**.

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

1 People injure dozens of flight attendants each year in air rage incidents.
Dozens of flight attendants are injured each year in air rage incidents.

2 They keep plastic restraints on all flights to deal with violence on board.

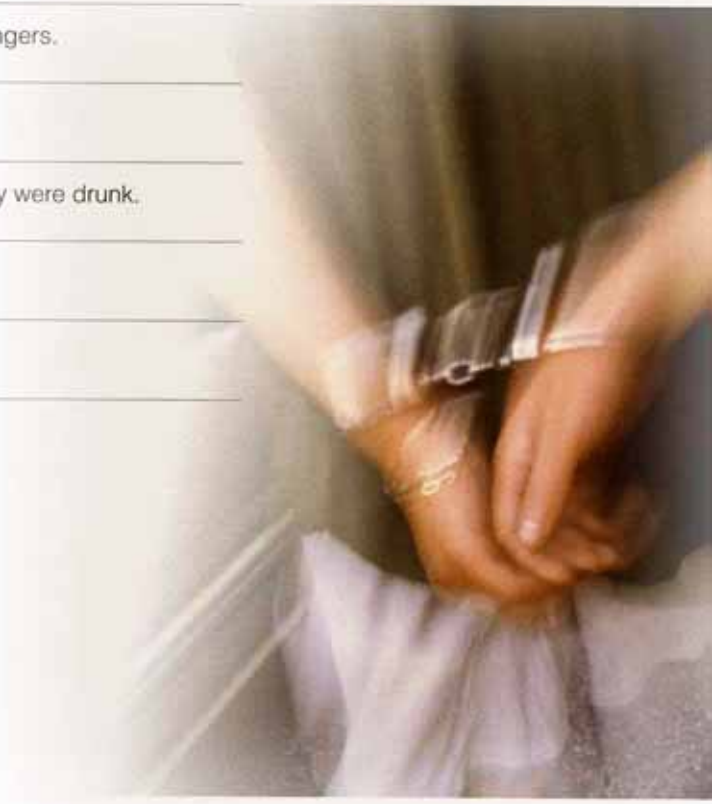
3 They give cabin crew training for dealing with aggressive passengers.

4 They used a belt to restrain the passenger.

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

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

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



Speaking

Work in small groups. Discuss the questions.

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

Section two – Suspicious passengers

1 Work in pairs. Discuss the questions.

1 What methods currently exist to identify a suspicious passenger at the airport?
2 What body language do you associate with a suspicious passenger? Make a list.

2 35 Listen to security expert Kalle Kaub talking about a new technique for screening potentially dangerous passengers. Does he mention any of the same body language you listed?

3 35 Listen again and answer the questions.

1 What does Kalle think of technology in airport security?
2 Why do criminals behave differently to other passengers?
3 What parts of the face make small movements when someone is nervous?
4 What do Kalle's officers do if they are suspicious of a passenger?
5 What three things can happen in a 'secondary screening'?
6 What types of crime have already been stopped using this technique?

Vocabulary – Strange behaviour

Complete the sentences with the words from the box.

body	eye	hand	head	leg	lips	palms	voice

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

Functional English – Expressing possibility and probability

might / may / could = it's possible
probably = you're not sure, but you think it's likely
must = you're sure – there is no other possibility
can't = it's impossible

1 Underline the correct alternative in sentences 1–7.

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

2 35 Listen to the extract again and check your answers.

3 Work in pairs. You are going to explain strange passenger behaviour. Student A go to p 106 and work with another Student A. Student B go to p 112 and work with another Student B.

Pronunciation – *-tion, -sion, -cion* endings

1 36 Work in pairs. Look at the words below. Answer the questions and then listen to check your answers.

detection **possession** **suspicion**

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

2 37 Underline the stressed syllable in the following words, then listen and repeat.

aviation **reaction** **conversation** **immigration**
inspection **intentions** **reduction** **violations**

Speaking

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

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

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

Section three – Unlawful interference

1 Work in pairs. Discuss the questions.

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

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

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

3 38,39 Listen again and answer the questions.

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

Pronunciation – Information groups and stress

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

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

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

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

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

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

3 39 Listen and check your answers.

Functional English – Reporting

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

Pilot	ATC
1 A passenger _____ to enter the flight deck.	5 They _____ a passenger _____ to enter the flight deck.
2 There _____ injuries.	6 The crew _____ me there _____ injuries.
3 _____ descend to the nearest available aerodrome?	7 They asked _____ descend to the nearest aerodrome.
4 _____ medical and security services ready.	8 They said _____ medical and security services ready.

2 39 Listen again and check your answers.

3 Work in pairs. Discuss the questions.

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

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

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

Speaking

1 Work in groups of three. First, write down ten questions that a journalist could ask the head of airport security about his / her reaction to the incident, the measures in place, etc.

2 Student A, you are the head of airport security. Answer the reporter's questions about the incident.

Student B, you are a reporter for a national newspaper. Ask the questions you prepared, and any others that you think of during the interview.

Student C, listen and note down the questions and answers (you don't need to write every word – just enough to help you remember afterwards).

3 Work together to write a report of the interview, and then read it to another group.

Section four – Language development

Functional English – Passive

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

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

Expressing possibility and probability

2 Match the beginnings with the endings to make sentences.

1 Oxygen deprivation ...
2 We are diverting as we ...
3 They will ...
4 One thing we ...
5 If we don't descend immediately, the man ...
6 Her behaviour is extremely strange which means she ...
7 There is a suspicious package near one of the gates so we ...
8 We must hurry, otherwise we ...

a ... could do is ask MedLink for some advice.
b ... might miss our flight.
c ... might be a cause of air rage.
d ... can't board the plane just yet.
e ... must have something to hide.
f ... probably arrive ahead of schedule because of a tail wind.
g ... may die.
h ... can't land on the runway because of excess surface water.

Reported speech

3 Underline the correct form.

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

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

Pilot I think it's a good idea if we delay take-off.

1 The pilot said he thought it was a good idea if we delayed take-off. (say)

Pilot Place the passenger at the rear of the plane.

2 _____ (tell)

Passenger I would like a glass of water, please.

3 _____ (ask)

Controller Confirm your position please.

4 _____ (ask)

Man I'm a qualified pilot.

5 _____ (mention)

Pilot We need to make an emergency landing.

6 _____ (request)

Pilot We have a problem.

Controller Please give more information.

7 _____ (advise)

8 _____ (ask)

Vocabulary – Physical conflict and restraint

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

1 **acomilius** intended to hurt or upset someone _____

2 **revosun** feeling excited or worried, or slightly afraid _____

3 **gyarn** very annoyed _____

4 **sagivreseg** behaving in an angry way that shows you want to fight, attack, or argue with someone _____

5 **taidateg** worried or upset _____

6 **vronopceautie** not willing to do what someone asks you to do _____

7 **vesabui** offensive or insulting _____

8 **issupicuso** that might be bad or dangerous _____

9 **rkudn** unable to control your actions or behaviour because you have had too much alcohol _____

10 **ryuunl** very difficult to control _____

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

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

1 A child was _____ the back of my seat with their feet.

2 The man started to _____ a steward by repeatedly demanding whiskey.

3 The passenger _____ to _____ one of the flight attendants with his shoe.

4 The pilot told him to _____ otherwise they would have to _____ him.

5 The drunk lady _____ another passenger in the stomach.

6 As they tried to _____ the passenger she _____ one of the flight attendants' hands.

7 The group were _____ the other passengers, shouting and swearing at them.

8 The group were told that if they didn't control their behaviour that they would be _____ from the plane.

PAIR WORK

STUDENT A

Unit 1 – Section 3

Pronunciation (p 12)

1 Read the call signs to your partner.

1 TG104 2 NH3993 3 KX565 4 ON778 5 QV260

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

Unit 2 – Section 1

Functional English (p 17)

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

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

AGL above ground level

DTG _____ _____ _____

FAF _____ _____ _____

FDR _____ _____ _____

OAT _____ _____ _____

RVR _____ _____ _____

Student B's abbreviations

FIR _____ _____ _____

TAS _____ _____ _____

TBS _____ _____ _____

TOGA _____ _____ _____ _____

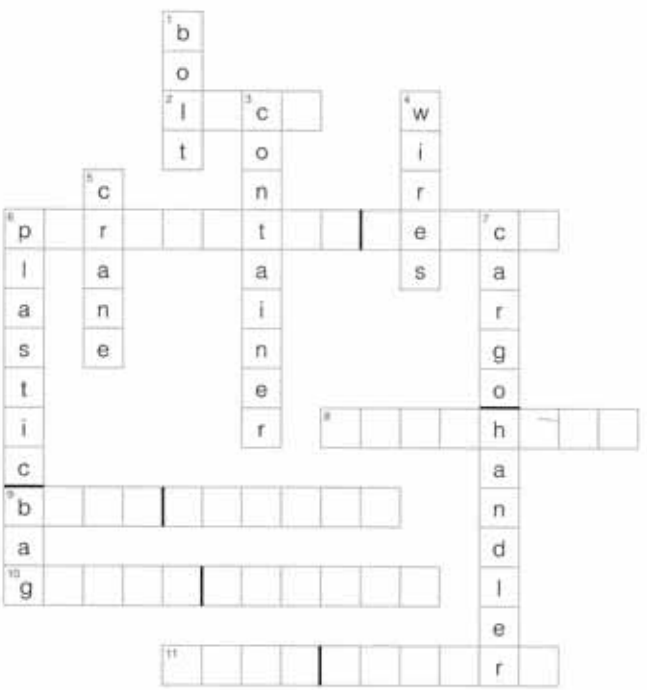
ZFW _____ _____ _____

ILS _____ _____ _____

Unit 4 – Section 2

Functional English (p 35)

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



Unit 5 – Section 2

Speaking (p 43)

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

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

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

It's 21.5 ft, or 6.55 m.

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

Unit 7 – Section 1

Speaking (p 57)

You are a customs official.

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

Forbidden

- Any machine with petrol
- Lighters
- Matches
- Fireworks

Allowed

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

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

Unit 9 – Section 1

Functional English (p 73)

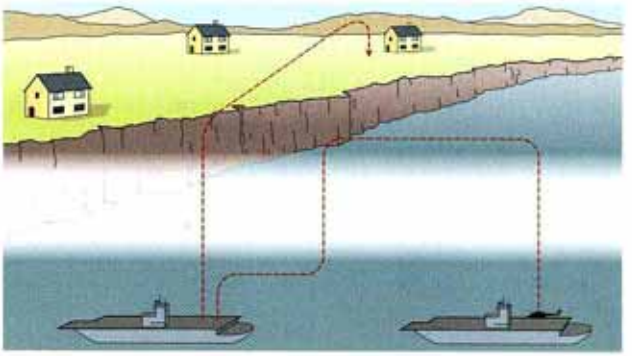
Listen to Student B's ideas about what could be happening in the pictures. Then, without showing the pictures, describe what is actually happening.

Unit 9 – Section 2

Functional English (p 74)

1 Describe your helicopter route to Student B. Do not show them your picture.

2 Listen to Student B's description of the route of their helicopter and draw it on your picture.



Unit 11 – Section 3

Pronunciation (p 92)

1 You are at a meeting reviewing emergency procedures. Listen to Student B talking from notes about an incident. You have the correct information in the report below. Correct Student B politely but clearly.

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

2 Later in the same meeting, you need to talk about another incident, but you only have notes you made at the time. Talk about the incident, making full sentences from your notes. Student B has the official report of the incident, and will correct any information that is wrong.

3 crew + 150 passengers
Chester, UK → Sacramento, California
flight level 250
cabin decompression caused return to airport
problem due to hole in left-hand cargo door,
caused by sharp object

Unit 12 – Section 2

Functional English (p 99)

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

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

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

Unit 1 – Section 2

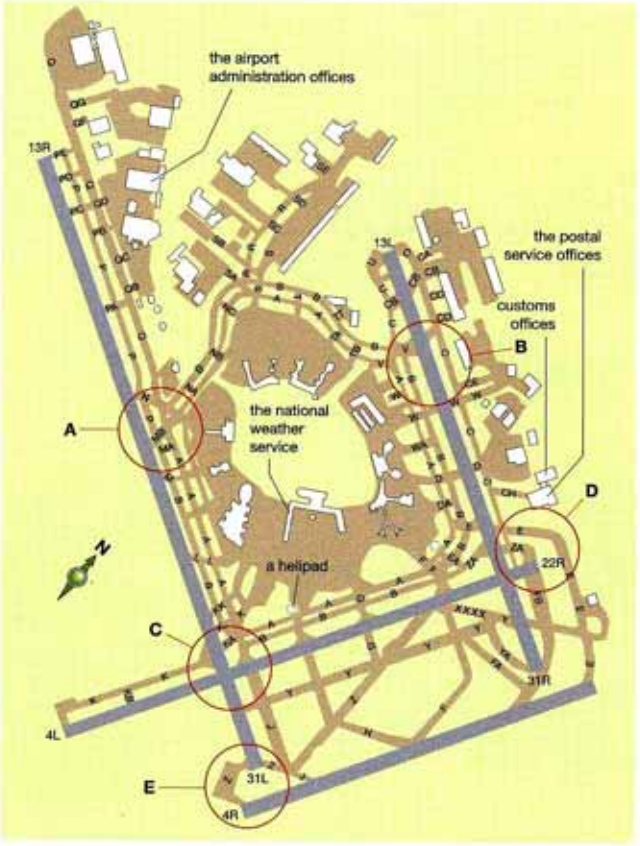
(p 10)

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

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

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

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



Unit 1 – Section 3

Pronunciation (p 12)

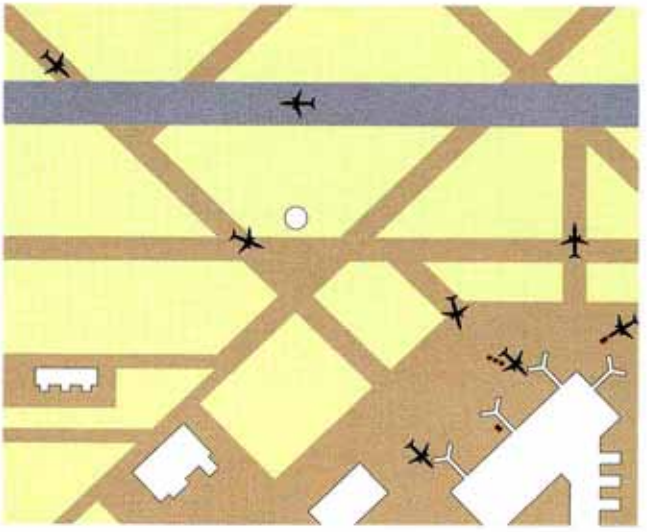
1 Listen to your partner and write the call signs.

2 Read the call signs to your partner then check what you have both written.

1 AB793
2 PH4870
3 FI190
4 EK265
5 ZB256

Speaking (p 13)

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



Unit 2 – Section 1

Functional English (p 17)

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

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

FIR flight information region
TAS _____
TBS _____
TOGA _____
ZFW _____
ILS _____

Student A's abbreviations

AGL _____
DTG _____
FAF _____
FDR _____
OAT _____
RVR _____

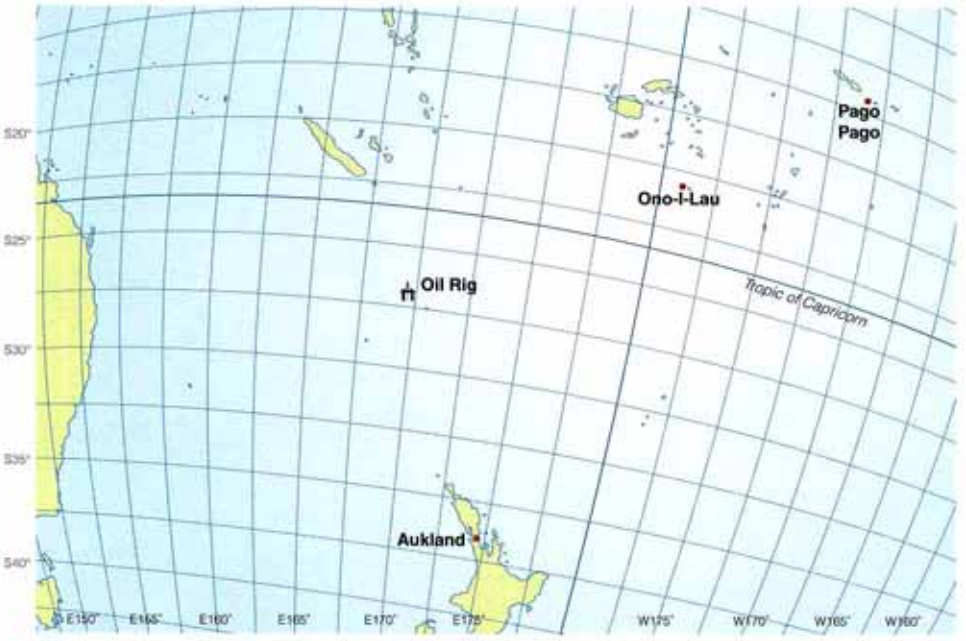
Unit 2 – Section 2

Vocabulary (p 18–19)

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

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

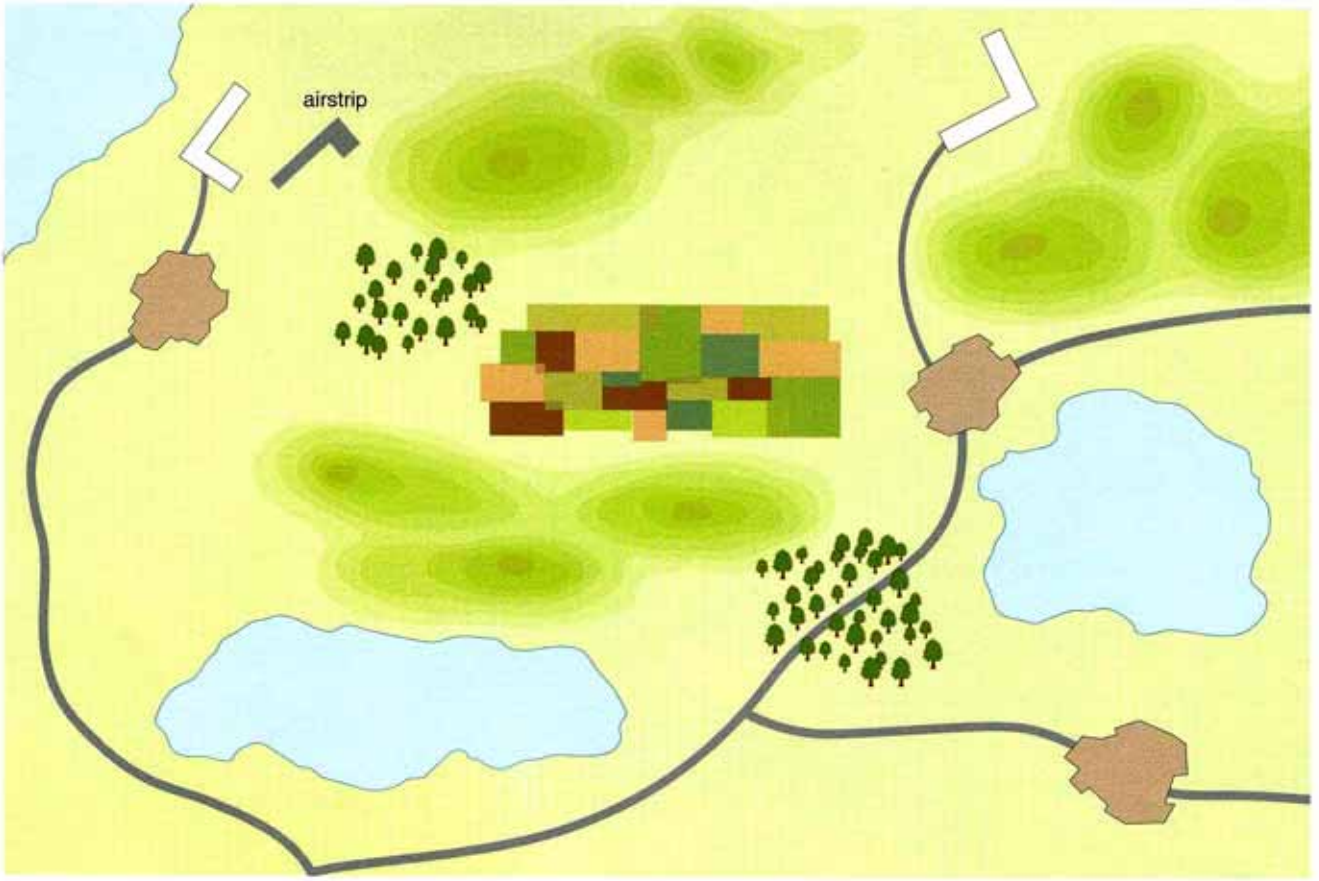
1	29°02'49.78"S	167°57'42.98"E
2	17°45'35.72"S	177°26'39.93"E
3	22°20'52.78"S	171°20'43.88"E
4	33°51'29.41"S	151°12'37.52"E



Unit 2 – Section 3

Speaking (p 21)

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



Unit 4 – Section 2

Functional English (p 35)

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

Unit 5 – Section 2

Speaking (p 43)

Ask Student A to give you information about the MX2.

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

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

Example
It's 22.2 ft, or 6.76 m.

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

Unit 7 – Section 1

Speaking (p 57)

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

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

Unit 9 – Section 1

Functional English (p 73)

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

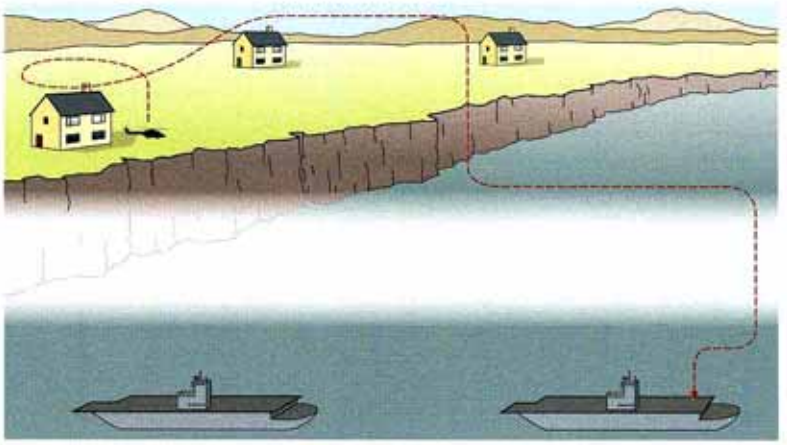
2 Change roles. Look at the Student B pictures on p 73.

Unit 9 – Section 2

Functional English (page 74)

1 Listen to Student A's description of the route of their helicopter and draw it on your picture.

2 Describe your helicopter route to Student A. Do not show them your picture.



Unit 9 – Section 3

Functional English (p 77)

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

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

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

Unit 10 – Section 3

Speaking (p 85)

1 You are a student pilot on a solo flight in a Cessna 172SP. Your partner is the flight instructor on the ground. You have fuel problems and engine power loss. You can't remember all of the manual's checklist for this situation. You have radio communications. Your instructor will tell you the correct readings and control settings for power loss. Check them against your control settings in the picture, and find out what mistakes you have made. Use language from the Functional English section.

2 Change roles. You are a flight instructor on the ground. Your partner is a student pilot on a solo flight in a Cessna 172SP. He/She has fuel problems and is going to make a power-off landing. He/She can't remember all of the checklist and is busy trying to fly the aircraft. You have radio communications. Go through the checklist below. Find out what mistakes he/she he has made and correct them.

POWER OFF LANDING

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

Unit 11 – Section 3

Pronunciation (p 92)

1 At a meeting reviewing emergency procedures, you need to talk about an incident that happened, but you only have notes you made at the time. Talk about the incident, making full sentences from your notes. Student A has the official report of the incident, and will correct any information that is wrong.

6 crew
221 passengers
took off from Blackpool, UK
heading for San Diego, California
flight level 230

problem - faulty door seals
emergency landing at Birmingham Airport
cause of decompression - one of the doors
not checked properly

2 Later in the same meeting, you listen to Student A talking from notes about an incident. You have the correct inform in the report below. Correct Student A politely but clearly.

Incident report

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

Unit 12 – Section 2

Functional English (p 99)

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

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

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

Unit 9 – Section 3

Functional English (p 77)

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

2 The controller cleared Flight 504 for a visual approach to runway 15. At 09:54 the crew reported on finals and were cleared to land. The F-28 touched down 4.5 m short of runway 15 and struck the edge of the runway threshold. It continued for 212 m before coming off the runway. It ran another 263 m before it skidded into the wall of a building and stopped.

3 Flight 1455, a B737-300, was vectored for a visual approach to runway 18. The flight's descent angle was more than 6°. Touchdown speed was 182 kt. The crew couldn't stop the aircraft on the runway and it overran. It crashed through the perimeter fence at a speed of 32 kt and stopped on a highway. The forward service-door escape slide inflated outside the plane and the nose gear collapsed.

LISTENING SCRIPT

Unit 1

01

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

02

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

03

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

04

Quebec
Romeo
Zulu
November
Hotel
Juliet
Sierra
Alpha

05

C = controller , P = pilot

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

06

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

Unit 2

07

P = Prochnow, C = controller, V = Vette

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

V N45AC. We are a DC-10 en route from Fiji to New Zealand. We received news of your situation. We are offering assistance. Can you tell me what happened?

P TE103. Thanks. Departed Pago Pago at three this morning with around 22 hours endurance. I wanted to have enough light to see my fixes. But the ADF stopped working correctly, and now unable to calculate my position. N45AC.

V N45AC. We are going to try to establish VHF communication with you.

08

Turn towards the sun and report your heading.

P Wilco. My heading is 274°.

V N45AC. We are facing the sun. Our heading is 270. The difference is 4°, so you are south of our position. Now hold out your hand. How many fingers do you have between the horizon and the sun?

P About two and a half fingers.

V N45AC. We have *four* fingers, so you are south-west of our position. Fly heading 315.

P Heading 315.

V N45AC. Maintain your position, so we can establish your position using the radio signal. We'll maintain our heading until we lose contact. Then we will turn left to re-establish contact, and then try to box you in this way. We'll contact you again very soon. N45AC. It's getting dark. What time is your sunset?

P The sun is setting now, and it is 0752 zulu.

09

V N45AC. Sunset on Norfolk Island is 0730 zulu. That means you are 5.6° east and 30° south of Norfolk Island. Maintain your heading.

P TE103. I can see a light. I think it's an oil rig.

V N45AC. Your co-ordinates are 31° south, 170° 21' east. You are 150 miles from Norfolk Island.

10

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

11

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

12

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

13

P = pilot, C = controller

P MAYDAY, MAYDAY, MAYDAY. TJB.

C TJB. Pass your message.

P MAYDAY, MAYDAY, MAYDAY. We're lost.

C TJB. Say last known position.

P Last known position was 15 miles south-east of CELRA VOR. TJB.

C TJB. Roger, last known position 15 miles south-east of CELRA VOR. Remain straight and level.

P I'm straight and level right now. We're in total IMC. I can't see the ground.

C TJB. Squawk 7700 on your transponder sir.

P Squawking 7700. TJB.

C TJB. I don't have you on my screen. Can you confirm your aircraft type, altitude and speed?

P We're in a Beech Baron. Altitude 3,000. Speed 110. TJB.

C TJB. Please state fuel on board and persons on board.

P I have 780 lb of fuel, and eight persons on board. Endurance is approximately one hour and 30 minutes ... I can see the ground now. I can see trees, and I can make out ... high ground on each side of the aircraft ...

14

C TJB. Can you fly into VFR?

P Affirm ... I can see high ground to the north. I'm flying up a valley, with woods to the north, and fields below me. There is a road below me.

C TJB. Confirm that you can see a road.

P Affirm. I can see a road.

C TJB. What side of the valley is the road on?

P The highway is to my right, on the south side of the valley.

C TJB. Can you make out a river?

P Affirm. There is a river.

C TJB. Is the river on the north side of the road?

P Affirm. The river is ... no ... the road is crossing the river. The river is now on the south side of the road?

C TJB. Can you clarify that the road crossed the river and is now on the south side of the road?

P Negative. The road is now on the *north* side of the river. The road is now turning south-east ... there's a reservoir below me now.

C TJB. Can you see a communications mast at 12 o'clock, at about 4 miles?

P Affirm. There is a communications mast at 12 o'clock.

C TJB. Turn hard left and make a 180° turn, heading 265. Expedite.

P Making 180° left turn, heading 265. TJB. I'm coming out of the valley and I can see a built-up area ahead and a lake at one o'clock. TJB.

C TJB. There is an airport with a tower 5 miles north-west. Say intentions.

P I'd like to land. Can you give me vectors?

Unit 3

15

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

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

16

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

17

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

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

18

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

Unit 4

19

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

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

20

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

21

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

22

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

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

23

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

24

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

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

Unit 5

25

I = interviewer, T = Thiago

I Welcome back to Radio Action. I'm here with champion air-race pilot, Thiago Silvo Corbera. Now, Thiago, can you tell us a little about aerobatic manoeuvres?
T The two basic manoeuvres are the loop, which is where you fly a vertical circle. You can fly an inside loop, where you pitch up into a circle, or an outside loop where you pitch down into a circle. And there's the roll, either a half roll – where the wings turn 180° to inverted flight so that you fly upside-down, or a full roll, where you rotate 360°.
I And what about the more complex manoeuvres?
T The barrel roll is where you complete one loop and one roll at the same time, making a flight path similar to a horizontal corkscrew, like when you open a bottle of wine. A more complex manoeuvre is the Cuban eight, which again is a combination of loops and rolls. This manoeuvre makes a shape like a number eight. My favourite manoeuvre is the tail slide. That's a straight vertical climb up until you lose momentum. You then fall backwards, tail first, until the nose drops through the horizon to a vertical down position, and then you drop back into level flight. Moves like this are fun, but the most important thing in an air race competition is completing the course as fast as you can.
I What aeroplane are you flying today?
T I'm flying an Extra 300s.
I And how is this different from normal aircraft?
T Well, they are quite different in that they are much lighter than normal aircraft and they have more power for their weight. This aircraft only weighs 672 kg but is 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.

26

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

27

The Extra 300s has a length of 22.6 ft or 6.9 m, a height of 8.5 ft – or 2.6 m – and an unladen weight of 1,480 lb – or 672 kg. The combined wing area is 98 ft^2 – or 9.1 m^2. The Extra 300s has a *g*-rating of +/-10 gs, and has a Lycoming 6-cylinder power plant which produces 300 HP, giving a VNE speed of 220 kt. Its stall speed is 60 kt. The aircraft can climb at a rate of 3,200 ft – or 975 m – per minute and roll at a rate of 400° per second. Its range is approximately 944 km – or 510 nm.

28

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

29

P = pilot, C= controller

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

P It's very difficult to pull or turn on the column … er… we're using asymmetrical thrust … er… we're using the engines to turn. We can only make big turns. Executive 56.

C Executive 56. Roger. Big turns only. Manoeuvre at your discretion.

P We're going to go out west and then make a straight in approach if that's possible. We're fighting to keep it straight and level. We will need a very long final. I don't think we have spoilers, reverse thrust or brakes, so we'd like the longest runway possible. Executive 56.

30

C Executive 56. OK, a visual on runway 07. Would you like emergency assistance at the far end of the runway?

P Affirm, Executive 56.

C Executive 56. The services have been activated. Do you want me to line you up with the end of the runway right now?

P Yes please, but we're really struggling to follow a heading. Please keep giving us vectors to the field. Executive 56.

C Executive 56. Roger. Turn left heading 050°.

P 050. We're adopting landing configuration now to slow us down. Executive 56.

C Roger. Executive 56.

P We have flaps and … er … and landing gear is down and control is easier now. We have the field in sight.

C Executive 56. Roger. You are cleared to land runway 07. Wind 170 with 26 kt.

31

P Approach, we're down safely, but we overran the runway Executive 56.

C Executive 56. Glad you're all OK. Is there anything else you need?

P We'll need help getting back to the apron. Executive 56

C Executive 56. Roger. You're off the end of the runway. We'll get a tow truck to take you back.

32

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

Unit 6

33

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

P So, what does everyone think about this – is it possible to separate your personal life from your work life? Yes, Antonio ...

A I don't think it is. For example, I heard recently about a senior captain who had just signed on for a three-day pattern of flying after spending three days off duty at home. After take-off he heard 'gear up' called but he retracted the *flaps* by mistake. Anyway, they found out afterwards that he was worried about money, and that his baby son had kept him awake, and so he was exhausted and unfocused at work.

P Well that illustrates how personal worries can affect performance. Things like a relationship breakdown or financial difficulties can cause stress which can impact work. So what can people do to help them cope with stress?

A Try and identify the sources of stress. Some experts suggest keeping a diary to record what events affect your energy and time. For some people there might be something specific that triggers anger or anxiety, or they might just feel overworked.

P So how can you avoid getting really run down?

Y You should try to take holidays from work regularly. Organize your schedule around them. And take regular breaks while you're working too.

G When you're starting to feel a bit down, I think it can help to talk to a friend about your problems and feelings.

A But if the cause of stress is outside of your control, you may want to get professional help on how to deal with it. Some companies provide counselling for employees.

Y For me, the best way of dealing with stress is to make sure you exercise, eat and sleep well. And if you can't sleep, well, then I suggest you see your doctor.

G Oh ... Another good idea is to try and make more time for those things you enjoy. Take regular opportunities to relax. I would advise a stressed friend or colleague to try some stress-reducing techniques such as meditation or a massage.

P That's great. I think you've come up with some really good ways of coping with stress. Now ...

34

stress
pressure
spending
flaps
flight
breakdown
specific
plans

35

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

36

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

CPT Cairo Centre, this is Divestream 290.
C Divestream 290 Cairo Centre. Pass your message.
CPT We have a medical situation on board. We are contacting MedLink now. Divestream 290.
C Roger, you have a medical problem on board. Keep us advised. Cairo Centre.
M MedLink. I'm Dr Slowinski. Which flight are you calling from please?
F This is Divestream flight 290 and this is Moustaf, the first officer.
M Thanks Moustaf. How can I help you?
F We have a passenger, a young man from Belgium. He's having difficulty breathing, he's shaking badly, and his eyes are shut.
M How old is the man?
F He's in his late twenties.
M Is he able to communicate?
F No. I don't think he can hear anyone. He's crying in pain.
M OK, you should move the other passengers away from the patient, if possible.
F Luckily his seat is to the rear of the aircraft, so we've already moved the other passengers away.
M Good. Have you removed his seat belt?
F Yes, we have. We've laid him down on the floor.
M That's good. Where has he been?
F From his passport, it looks like he has been on holiday in Egypt for ten days.
M Have you found any other information about him?
F No, we haven't found anything else yet. We're looking through his belongings.
M Has he eaten or drunk anything?
F No, the crew haven't begun to serve drinks yet.
M I see you are travelling to Paris CGD. How long have you been airborne?
F We've been in the air for about 15 minutes.
M So you're still climbing. Are you climbing rapidly?
F Yes we are. ATC asked for a steep climb out of Cairo due to traffic.
FA Moustaf, he has just started coughing blood, and we think he is losing consciousness.
F Oh dear ...
FA I've just looked in his hand luggage. I found a hotel receipt, a wallet and a scuba-diving log book. It looks like he dived this morning.
M Did I just hear that the patient dived this morning?
F Er ... yes.
M OK, this sounds like it is a case of decompression sickness, which is a critical condition. You should stop climbing and descend right away if you can – every foot you climb could seriously affect the patient's health. You should divert and find an alternate airport that has medical services. Try asking ATC to help you find an alternate that is close to a decompression chamber. There should be a diving decompression chamber somewhere on the Red Sea.
F Roger, levelling off and initiating descent ...

37

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

38

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

39

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

Unit 7

01

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

02

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

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

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

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

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

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

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

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

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

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

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

03

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

04

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

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

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

05

PF What was that? This isn't right.

PNF What's happened?

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

PNF Where's the problem?

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

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

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

PNF OK?

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

PNF Could you move the passengers away?

CCM Sure, will do.

PNF Go have a look

CCM I'll check it out now.

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

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

PNF What do you think caused it?

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

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

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

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

06

CCM I can't get back there.

PNF Why not?

CCM The smoke's too heavy.

PNF Are the passengers OK?

CCM People are starting to have trouble breathing.

PNF We have to go down.

PF Initiating an emergency descent.

07

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

Unit 8

08

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

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

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

09

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

10

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

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

11

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

12

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

E Shenton tower. ES23. We're ready for departure but we can see lightning out to the right. Can we … er … wait here until the weather passes? ES23.
C ES23. Affirm. Hold short of runway. Stand by.
E Holding short of runway. ES23.

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

13

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

14

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

15

short
visual
watch
roger

16

approach
edge
measure
switch
threshold
emergency
usual
shear

Unit 9

17

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

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

18

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

19

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

20

P = pilot, C = controller

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

21

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

22

P = pilot, C = controller

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

23

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

C S62. You are seven miles out on long final. How is your landing gear?
P1 We've tried winding down the gear manually but it's stuck about halfway out. S62.
C S62. State intentions.
P1 We don't have much fuel. We're going to land this time. S62.
C S62. Use runway 34R. There is smooth ground on each side of the runway and you have a lot of space. Crash, fire and rescue services have been activated.
P1 Runway 34R. I have the field in sight sir. S62.

24

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

Unit 10

25

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

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

26

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

27

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

C Polar 69. Roger. Report turning final, runway 29. Wind 320 at 10 kt.
PNF Report turning final, runway 29. Wind 320 at 10 kt. Polar 69.
PF Number one doesn't sound good. We're not running short of fuel, are we? We should have plenty of fuel.
PNF We've got fuel ... but fuel flow should be much higher. Torque pressure is meant to be at 100, not 40.
PF That's engine number one gone. Feather the engine.
PNF It's feathered.
PF Tell them we've got one engine shut down.
PNF PAN PAN, PAN PAN, PAN PAN. Bodo Tower, Polar 69. We've lost one engine ... er ... we're turning final at this time.
PF I smell smoke! We're losing the other one. Contact tower and tell them to get the fire trucks out.
PNF Tower, Polar 69 request fire, crash, rescue services.
C Polar 69. Roger. I'll activate fire, crash, rescue. Say your fuel and persons on board.
PNF Polar 69. Roger. We've got two crew and 120 passengers. I don't know about fuel. We've got a fuel problem.
PF Can we get the other engine going? We're not going to make it ... we'll have to land on the river.
PNF Tower, we've lost both engines. We're on final here to the river. Polar 69. You want the gear up?
PF Yeah put it up. We don't want it to catch on the ice. We've got smoke. Shut down number two.
PNF Pull both extinguishers?
PF Fire bottles. Tower, this is Polar 69. We're down on the ice, nobody's hurt. We had a fuel flow problem and we lost power on the engines and couldn't get to the runway. We're on fire over here though ...

28

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

Unit 11

29

T1 = trainer, T2/T3/T4 = trainees

T1 OK everyone, let's begin the workshop by looking at the causes of decompression. Now, have any of you here ever had any decompression-related incidents?
T2 ... er ... well last year a flight of ours was delayed by four hours due to a cracked windshield. It was a tiny crack, very difficult to see, but the captain refused to fly until maintenance replaced the windshield.
T1 OK, it sounds like you guys did the right thing. Now, let's think about other possible causes of decompression. Any ideas?
T2 Bird strike.
T1 Yes.
T3 Failing to lock a door.
T1 OK.
T4 Metal fatigue.
T1 Good. Here I've got photographs of some real incidents. Can you pass the photographs around, please? First, here's a DC10 in June 1972, whose rear cargo door blew out due to a faulty lock. Rapid depressurization occurred when the door tore away a spoiler and smashed into the tailplane. OK, this one shows a famous incident of explosive decompression, this time with a Boeing 737 in April 1988. The aircraft had corrosion, and also serious metal fatigue. Almost 35 m^2 of metal tore away from the upper part of the fuselage, cutting off the electrics, all communication lines and oxygen supply. You can see here that the lower part of the airframe buckled and the nose dropped down by one metre. Unfortunately, one life was lost when a member of the cabin crew was sucked from the aircraft on decompression. Luckily, the nose gear locked down on landing.

30

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

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

31

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

32

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

P MAYDAY, MAYDAY, MAYDAY. Centre. Kite 63. Making an emergency descent.
C Calling station. Say again. Say again.
P This is Kite 63. I say again, Kite 63 making an emergency descent.
C Kite 63. Cleared to FL 100.
P Centre … 63.
C Kite 63. You're breaking up. Say again.
P We had a rapid decompression. We are just west of the PAYAM VOR, passing FL 240. Kite 63.
C Kite 63. Understand you are depressurized. You are cleared to FL 100. I say again. Descend to FL 100. Report reaching.
P FL 100. Kite 63. Centre this is Kite 63 level at 10,000. Request immediate landing.
C Kite 63. I can't hear you sir. Loud background noise.
P Centre this is Kite 63 level at 10,000. Request immediate landing.
C Kite 63. Read you 5. Squawk 7700.
P 7700.
C Kite 63. I understand you have lost cabin pressure. You are 40 miles from the field at your 11 o'clock, turn left heading 070° altimeter 1002. Say intentions.
P The captain is unconscious. Request immediate landing and medical services. Kite 63.
C Kite 63. Roger, straight in approach and landing runway 07. Wind 160 at 11 kt.
P Straight in approach and landing runway 07. Wind 160 at 11.
C Kite 63. Do you have any aircraft damage?
P Stand by.
C Kite 63. Standing by.
P You OK?
FA Yes. It's difficult to hear you.
P Have we got any damage back there?
FA I can't see unless I get out of my seat. Er … yes, the leading edges are badly dented, and the engine inlet cowls. I couldn't see any further back. Are we going to be OK?
P Yes, we'll be fine. Is anyone injured?
FA Yes, two were injured when they fell from their seats in the turbulence. What happened?
P Hailstorm.
FA How long is it going to take to land?
P It'll take about 15 minutes.
FA 50 minutes might be too long.
P Not 50 minutes – 15 minutes.
FA Ah, OK. One passenger is bleeding badly. We've got to get help soon, otherwise he might not make it.
P Sorry? Say again.
FA If we don't get to a doctor soon, he may not survive.
P We'll get him to a doctor as soon as we can. We'll have an ambulance waiting for us.
FA OK, thanks.
P Centre, Kite 63. We had a hailstorm that lasted about … er … ten seconds. The left side of the windshield has smashed, the right side is cracked, we have damage to our wings and maybe the tail, but the aircraft feels OK. We've got at least two serious injuries. Kite 63.

33

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

34

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

Unit 12

35

P =Presenter, KK = security expert

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

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

P What are these techniques?

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

P So what behaviour are you looking for?

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

P And how do you use these techniques?

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

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

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

P Do these techniques work?

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

36

detection
possession
suspicion

37

aviation
reaction
conversation
immigration
inspection
intentions
reduction
violations

38

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

PNF What's going on?

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

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

PF OK, notify Centre.

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

T Interflight 547. Standing by.

PNF It looks like they've forced him to the ground and got the cuffs on him.

FA We've a problem back here with a violent passenger. We've restrained him, but he's still struggling.

PNF Is he drunk?

FA I don't think so, but he's very agitated and abusive. He said we were in danger and he had to fly the plane. It must be a mental health problem.

PNF Is anyone hurt?

FA No, we're OK. What do you want us to do with him?

PNF Secure him, away from the other passengers if you can. Get someone to stay with him until we land.

PF Right, contact ATC and tell them that we've got an unruly passenger. Request a diversion to nearest suitable airfield. Have medical and security there to meet us.

39

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

T Interflight 547. Understand you have an unlawful interference. Please say fuel and persons on board.

PNF Er … 178 persons and four hours of fuel remaining. Can we descend to the nearest available aerodrome? We'll need medical and security services ready. Interflight 547.

T Interflight 547. You are approaching Korean airspace. Contact Inchon Control on 123.6. I'll advise them of your situation and pass on your request.
Hello, this is Tokyo Area Control Centre here. We have a problem B 757-200, Interflight 547, G585 westbound towards SAPRA at FL 340, squawking 1243. We expect it in your airspace at approximately 47.

I OK, a 757 squawking 1243. What's the problem?

T We had a report from the flight crew. They said a passenger had attempted to enter the flight deck. The first officer said that crew had restrained him, but believed he was still a threat.

I Roger, are there any injured persons?

T The crew told me there were injuries, but they didn't give details.

I Did they state intentions?

T They asked if they could descend to the nearest aerodrome, and they said they'd need medical and security services ready.

I Thank you. Leave it with us.

Macmillan Education
Between Towns Road, Oxford OX4 3PP
A division of Macmillan Publishers Limited
Companies and representatives throughout the world

ISBN 978-0-230-02755-8

First published 2008

Design by Designers Collective
Illustrated by Alisdair Bright, Richard Duckett, Peter Harper, Ben Hasler, Graham White
Cover design by Keith Shaw, Threefold Design Ltd
Cover photographs provided by Alamy and Aviation Images

Authors' acknowledgements
There are many pilots, controllers, aviation specialists and language teachers around the world who have contributed directly and indirectly to the making of Aviation English to whom we owe thanks. However, we would like to give special thanks to the following people, without whom we quite simply wouldn't have a book: Roger Mayer, 727 Captain and Instructor; Gheorghe Sinpetrean-Comsa, Air Traffic Control Officer, Bucharest Area Control Centre; Orapim Chammek, Senior Air Traffic Controller, Bangkok Area Control Centre; Bernd Hechenegger, First Officer on A320-Series and Flight Instructor; Pieke Satijn, Training specialist, Air Traffic Control The Netherlands (LVNL). We are extremely grateful to them for their professional expertise, hard work, generous support, willingness to answer simple questions and commitment to the Aviation English project. We are forever in your debt! Needless to say, any errors that occur in Aviation English are ours, not theirs.

The authors would also like to thank the following people for their help and advice: Federico Crespo Airline Captain, Stalbek Ahmedov Tower Controller, David Roberts Firefighter, Dr Adrian Renouf, Caraman Mihai Air traffic Controller, Tony Turpin helicopter pilot.

Henry would like to thank: Sian, my partner in mischief, for dealing so graciously with a grumpy and self-centred husband for 18 months. As with everything, I wouldn't be where I am without her. As always, I'd also like to thank my mother, Bridie, and my sister, Suzie, and my friends who remain nameless – you know who you are.

Andy would like to thank: Megan, Rhiannon and Nadia. No princess this time but we do have a prince. My mother Eileen for the constant encouragement, and my wife Ada Yu Wang for her eternal support and patience.

They would both like to acknowledge the hard work of all at Macmillan to put in the time and effort to truly understand what the world of Aviation English is all about. And finally, special thanks to our editor James Greenan, who showed us how to make the impossible possible.

The authors and publishers would like to thank the following for permission to reproduce their photographic material:
Alamy/Roger Bamber p12t, Kari Niemeläinen p26cr, JMS p33bcl, David Soulsby p33c, Steve Allen p33cr, vario images GmbH & Co.KG pp34tr, 91, Sébastien Baussais p34bl, Ian Shaw p34bc, Bernd Mellmann p38, Lucidio Studio, Inc. p44, Bobo p48tl, Jupiter Images/Ablestock p48ctr, artpartner-images.com p48cb, Look Die Bildagentur der Fotografen GmbH p54, Medical-on-Line p55l, Martin Harvey p66ct, Bill Howe p66cb, John Elk III p69, Andrew Fox p71r, Jim West p101b; **Austin J.Brown (ww.aviationpictures.com)/**pp26tr, 33br, 42, 43r, 47, 74b, 80; **Aviation Images/** pp8c, 16, 24, 26tl, 26b, 28, 29, 30, 31, 33tl, 33tr, 33bcr, 34tc, 36, 45, 51, 72tl, 72cl, 72tr, 73tl, 73tcl, 73tr, 76tl, 76tc, 76tr, 79, 82t, 83, 105tl, 105bl, 105tr, 109t, 109ct, 109b; **Bananastock/**p48ctl; **Brand X/**p48br; **Cody Images/**pp76br, 105br; **Construction Photography/**Michael Reinhard p11; **Corbis/**James Leynse p9, Nik Wheeler p32, Russell Munson p37, Ruud Taal/epa p49, Despotovic Dusko p57, Kai Forsterling/epa p59, George Hall p63, Jim Reed p66cr, Firefly Productions p71l, Armando Arorizo/epa p73tcr, G. Baden/zefa p86, Helen King p90b, Anna Peisl/zefa p98, Reuters p101t, Armando Arorizo/epa p109cb; **David Wallace/**p34br; **DigitalVision/**p66bl; **Getty Images/**pp58t, 84, 100, Jerome Tisne p15, AFPp34tl, Billy Hustace p39, Harrison Shull p41, Colin Gray p48b, James Day p53, Richard Kaylin p56, Steve Bloom p65, Jean-Pierre Pieuchot p66tl, Time & Life Pictures pp74t, 95, Joe Raedle p75, Ghislain & Marie David de Lossy pp89, 94, Jeff Harbers p90t, Stewart Cohen p96, Rex Ziak p97, pulp photography p99; **Image Source/**icon; **Jupiter Images/**p52; **PA Photos/**p88b; **Photodisc/**p33bl; **Photolibrary/**p66br, 78; **Reuters Pictures/**Laszlo Balogh p43l, Larry Chan p72cr; **Science Photo Library/**Mark Thomas p48tr, Mark Sykes p48cbl, Tony Mcconnell p55r; **Superstock/**Age fotostockp60; **Winnipeg Free Press/The Canadian Press(Wayne Glowacki)/**p82b; **www.gen-corp.jp/**p40.

Printed and bound in Spain by Edelvives

2012 2011 2010 2009 2008
10 9 8 7 6 5 4 3 2 1

Aviation ENGLISH

For ICAO compliance

Henry Emery is a teacher, teacher-trainer and examiner of plain English for aeronautical communication. He is co-director of a language consultancy (www.emery-roberts.co.uk).

Andy Roberts is an experienced English test designer and examiner. As a partner in emery-roberts he delivers aviation English teacher training all over the world.

Henry Emery and Andy Roberts
with Ruth Goodman and Louis Harrison

Aviation English **is a language course for aviation professionals, particularly pilots and air-traffic controllers. It has been specifically designed to help students achieve and maintain ICAO Level 4.**

If you are an independent student, this pack is all you need. The accompanying CD-ROMs provide interactive practice in authentic aviation situations and intensive pronunciation work. They also contain downloadable Class audio and an Answer key.

If you are a teacher, the accompanying Teacher's Book is a useful source of ideas and support information when using the course, particularly if you don't have a background in aviation.

Visit www.macmillanenglish.com/aviation for more teaching resources and information about ICAO language requirements and testing.

MACMILLAN
www.macmillanenglish.com

Use your Macmillan English Dictionary with this book.

ISBN 978-0-230-02757-2