



Aviation

ENGLISH

For ICAO compliance

TEACHER'S BOOK

John Kennedy


MACMILLAN



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INTRODUCTION

This book has been written to support the teaching of the course book, *Aviation English*. Air traffic controllers and pilots who attend English courses have the same language needs as any other students who wish to improve their English for professional purposes. They are not attending English courses to learn the technical vocabulary they need for their jobs, but rather to improve their general ability to communicate on work-related matters in English.

You may have limited or no experience in the teaching of English for civil aviation. If so, this Teacher's Book has been written to help you. There are comprehensive explanations for non-specialists of the issues and the particular situations which air traffic controllers and pilots have to deal with. Detailed teaching notes are also provided for each unit. The Teacher's Book therefore has a dual function. To provide background information and explanations on aviation contexts and to provide some suggestions as to how to teach the material most effectively.

Language skills for pilots and controllers

English language training of pilots and controllers focuses almost exclusively on improving their listening and speaking skills. Effective verbal communication is essential to ensuring safety in civil aviation. Communications are voice only, that is controllers and pilots talk to each other at a distance, through radiotelephony communications. The verbal message is the only communication tool at their disposal (though basic routine messages are sometimes exchanged electronically).

A certain degree of **fluency** is required because controllers have to communicate with several aircraft at the same time and they cannot wait for an unreasonably long time for a pilot to pass a message. Pilots need to receive information and instructions in good time to react accordingly. The **interaction** between pilots and controllers must be effective, as both parties need to be able to check, confirm and clarify when misunderstandings occur. Controllers and pilots require sufficient **vocabulary** to be able to communicate in both the routine and non-routine situations which may occur in their jobs. In addition, controllers and pilots need to have a good command of basic **grammatical structures** so that they can communicate information in a format which will be understood by their interlocutor. And finally, **pronunciation** needs to be sufficiently clear and intelligible to the international aviation community.

The five features highlighted above (fluency, interaction, vocabulary, grammatical structure and pronunciation) are the criteria which appear on the ICAO (International Civil Aviation Organization) language proficiency scale. The sixth and final feature to be assessed on the scale, which is also of fundamental importance, is **comprehension**. Controllers and pilots must be able to clearly understand their interlocutor in routine everyday situations, and where an unusual or an unexpected situation might cause confusion, they must have clarification strategies available.

The communication skills of both controllers and pilots are evaluated according to this ICAO scale, with six different descriptors for each of the six features mentioned above. The levels are defined as follows:

Level 6	Expert
Level 5	Extended
Level 4	Operational
Levels 1–3	Non-operational



Controllers and pilots learn to communicate in what is termed **standard phraseology** during their basic training, and they put it into practice on a daily basis. This phraseology is sufficient to communicate at least 95% of what pilots and controllers need to say. It consists of simple clear messages designed for routine situations. There is an absence of grammar, prepositions, complexity, words that are difficult to pronounce, words with ambiguous meanings, etc. The manual on standard phraseology can be simply memorized. Through repetition on a daily basis, controllers and pilots can become highly proficient in their use of phraseology. They can use and understand phraseology without necessarily being able to speak or understand English.

The problem is that a good knowledge of phraseology, which is appropriate for exchanging expected routine messages, is not sufficient to deal with a non-routine situation. A non-routine situation may also be an emergency situation, or have the potential to develop into an emergency situation.

The only way that pilots and controllers can be sure to be able to communicate in a non-routine situation is if they both have a sufficient level of proficiency in a common language. For the international aviation community, this language is English. Due to this need to communicate in unexpected situations, ICAO now requires all controllers and pilots to demonstrate a minimum of level 4 on their six-point language proficiency rating scale. The descriptors of level 4 measure the ability to communicate in what ICAO terms **plain language**, in order to make a clear contrast with the phraseology suitable for routine situations.

Aviation English focuses on plain language throughout. A brief look at the contents page and the topics included in the book will give you an idea of the topics your students need to be able to talk about.

In many other professions, students have the opportunity to use and indeed develop their English at work every day. If one considers that phraseology is 'not really English', and that neither controllers nor pilots deal with non-routine situations regularly (nor would we want them to), then we can see that pilots and controllers do not communicate in plain English on a daily basis. This together with the potentially serious consequences of any misunderstanding which might occur when they do need to use plain English, provide two important justifications for English language training for controllers and pilots.

Many controllers and pilots need the opportunity to improve and practise their English in a language classroom, guided by a teacher, and they need suitable materials to aid them in doing so.

The aviation English teacher

The first and most important point to make is that an aviation English teacher cannot and is not expected to be an expert in aviation. Of course, it helps to have a general knowledge of how airports, aircraft and airlines operate, as well as having some idea of what the jobs of air traffic controller and pilot involve. Assuming you have flown before as a passenger, then you will already have some ideas before meeting your students.

Students will want to learn about and discuss situations which are relevant to their jobs, but they are unlikely to ask you any questions of a technical nature. They know where they can find the answers themselves to such technical questions. Indeed you will probably find that you can ask your students questions about their work, about the procedures followed and about why things are done in a particular way. They, as experts in their own field, will be able to provide answers which you, as an expert English teacher, can help them formulate in English. They may derive some satisfaction from the fact that they are teaching you just as you are teaching them.

Perhaps the most important attribute you need to become an effective aviation English teacher is an enthusiasm for and a general interest in aviation. This, coupled with a desire to learn more, is likely to be appreciated by your students.

Components of the *Aviation English Teacher's Book*

Each unit begins with a two-page introduction to the unit topic. The introduction has been written for the teacher who has little or no knowledge of civil aviation and explains key terms which appear in the unit. It is a good idea to read the introduction before you look at the material to be taught in the Student's Book. The introduction also features the section *For fun ...* which presents a joke relevant to the unit topic that you could share with your students.

Detailed teaching notes are then provided for the activities to be found in the Student's Book, as well as answer keys and listening scripts. The (II) in the listening scripts indicates when the audio could be paused for a more authentic time frame.

The teaching notes include suggested warmers, extension activities, suggestions for alternative ways to set up certain activities and some general advice and teaching tips.

At the end of each unit there is a one-page photocopiable activity which you could use if you have sufficient time available.

Organization of the *Aviation English Student's Book*

Section 1 of each unit introduces the theme of the unit, usually through a reading text and a separate presentation of the basic vocabulary needed to talk about the topic. Section 2 contains a detailed listening activity. As well as comprehension activities, language functions and pronunciation skills are also taught (note that these sometimes appear in Sections 1 and 3 as well). The main focus of Section 3 is a non-routine situation (or incident), in which students listen to the communication between pilot(s) and controller(s) to find out how the situation develops and how it is finally resolved. Finally, Section 4 contains activities which practise the language functions and the vocabulary taught in the unit. These activities can be set as homework.

General advice for using the *Aviation English Student's Book*

Let your students speak! The subjects to be found in the book will arouse their interest and there are frequent opportunities, built into the structure of each unit, for them to express their views on particular issues, or to role-play certain situations. Allow students to take full advantage of such activities. Speaking is of fundamental importance for both pilots and controllers.

Make full use of all the listening comprehension activities. Practising and improving comprehension is the other main goal for your students, and if their listening comprehension develops, improved speaking skills usually follow.

Support the efforts of your students to speak by drawing their attention to the vocabulary and the language functions contained in each unit. Be ready to supply your students with additional language as and when they require it.

Act as an interested interlocutor in class discussions. If you don't understand something, tell your students, as this gives them the chance to explain in English.

Aviation English, while designed to be taught in order from Unit 1 to Unit 12, is quite flexible. It will work equally well if you leave out certain units or change the order in which you approach them. If you are using this book for a short course, and you know that it won't be possible to complete all the material, you could ask students to choose the units which look most interesting to them.

Don't forget that although your students all work in civil aviation, they may have very different knowledge, experiences and ideas to share. Be ready to exploit this in the classroom by encouraging students to share experiences and to explain technical matters to each other.

Recommended websites

There are literally thousands of websites providing useful and interesting information on civil aviation. The following are a small selection which might be of interest to you should you wish to further develop your knowledge of civil aviation.

You might also consider recommending one or more of these websites to your students, for their own general interest, and also to encourage them to read and to listen to more aviation English outside the classroom.

Students may already be familiar with some of these sites, or they may have their own favourites, which they can then recommend to you and to each other.

As in any other English language course, the more things you encourage your students to do using English outside the classroom, the better!

www.liveatc.net/feedindex.php?type=all

LiveATC.net: This is an excellent site if you wish to listen to some real air traffic control from different locations around the world. You can choose your geographical area at the top of the page and the locations which are marked in green are accessible. Most of what you listen to in this way is entirely routine, but the site also collects particularly interesting segments where 'something happened', though you need to join up to listen to these.

www.pprune.com

The Professional Pilots Rumour Network: This site is an interesting exchange of news and views. As its name suggests, it's a site for pilots, but anyone concerned with aviation will find many interesting topics and stories to read about.

www.virtualskies.arc.nasa.gov

Virtual Skies: This site is an excellent resource for the teacher who is new to the world of aviation. It is an educational site, set up by NASA education, designed for schools and featuring many of the subject areas included in this course book. Technical explanations are clear to follow and interesting interactive activities are included.

www.nts.gov/nts/query.asp

NTSB Aviation Accident Database & Synopses: The NTSB (National Transportation Safety Board) is the body which investigates all aviation accidents in the US. They also investigate accidents abroad when a US registered aircraft is involved, or when their expertise is called upon. You can use their extensive database to research a particular accident or a type of accident. There is also a section dealing with incidents.

www.faa.gov

FAA (Federal Aviation Administration): The FAA is the civil aviation authority of the US. Their site is extremely comprehensive and contains interesting and official information and statistics on a wide range of safety issues, amongst other things. This site is worth browsing or visiting when you have a particular subject to research.

www.pilotfriend.com

Pilot resources and aviation weather for general aviation: This heading on the home page is somewhat misleading as the site contains information on many issues. Amongst others, it's worth looking at the sections on flight safety, aviation history and aviation humour.

www.atwonline.com

ATW (Air Transport World) Daily News: This is an excellent site for keeping up to date with the latest aviation news. You might wish to register for free daily news updates to your email address. You can advise your students to do likewise.

www.aopa.org/pilot/never_again

AOPA (Aircraft Owners and Pilots Association) Online: This is another very comprehensive site and the title reflects its content. You may wish to browse this site to see what could interest you or your students. The address above will take you directly to an extensive series of pilot stories, each entitled 'Never again'. These stories are all about an error of judgement on the part of a private pilot, which could have been fatal and the pilots explain what they learned from these experiences.

AIRPORTS AND RUNWAYS

Introduction

The first airports were simply grass fields (airfields) but as aircraft became heavier, paved **runways** were developed. This also meant that airplanes could land and take off in all weather conditions. Over the years airports have become bigger and busier with elaborate **terminal buildings** to improve passenger comfort and offer retail services. The world's biggest airport is now considered to be Atlanta, with Heathrow airport generally recognized as the world's biggest international airport, though it faces serious competition from Charles de Gaulle (Paris), Frankfurt and Schipol (Amsterdam). Not everyone agrees on the 'biggest' though, as an airport's size can be measured in terms of the number of **movements** (landings and take offs) that occur in a year, the number of passengers that pass through, the number of runways available or even the surface area occupied. The airport featured in Section 2 of the unit, JFK (New York), is another of the world's biggest and most famous.

Airports are sometimes referred to as **aerodromes**, though this term is considered old-fashioned and often implies a small airport. The term **airstrip** is used when not much more than a small basic runway is provided (often used by the military).

When talking about airports, 'big' is not always beautiful. In recent years there has been considerable controversy concerning the environmental impact of increasing traffic at large airports (see Unit 10). Noise pollution is a particularly controversial issue, and expanding existing airports or building new ones is becoming increasingly difficult in many parts of the world.

Organization

Airports are divided into **airside** and **landside** areas.

Airside areas are where the airplanes can be found. These include **runways** and **taxiways**, as well as **stands**, where aircraft are parked for providing direct access to the terminal building through an **air bridge** or **jetway**. The airside area also includes the **apron**, where several aircraft may park at a distance from the terminal building (buses then take passengers to and from the aircraft).

Access to all airside areas is subject to tight security controls. Landside areas, on the other hand, which include shops, restaurants, car parks and check-in areas, are more accessible to the general public.

Air Traffic Control (ATC) is usually provided from a control tower situated on-site. At major airports ATC is separated into **ground control** (responsible for aircraft and all other vehicles using the apron and taxiways) and **tower control** (responsible for aircraft landing and taking off on the runways). **Approach control** handles aircraft which have just taken off or are about to land. **En route** traffic is controlled at an area control centre, which can be situated anywhere, as the aircraft are only visible on a controller's radar screen.

Runways

Small airports may have only one runway but most major airports have several. When a new airport is built or an existing one expanded, **runway layout** is of primary concern. Runways need to be laid out to make optimum use of the prevailing winds because aircraft need to take off and land directly into the wind if possible. Crosswinds can be a dangerous hazard. Assuming that the airport will be busy, the layout should also be efficient, ideally allowing runways to be used simultaneously. A further important consideration is the way in which local resident communities will be disturbed by noise. At the end of Section 2 in the unit, students are given the opportunity to design their own airport layout.

The three main runway configurations are **parallel** runways, **open-V** runways (they diverge but do not intersect; when viewed overhead the shape is a 'V'), and **intersecting** runways. The latter two types are relevant in locations where the direction of the prevailing wind changes.

Runways are labelled depending on their direction relative to the magnetic compass (to the nearest 10°, with the zero left off). This number is clearly indicated at the end of each runway. If a runway is labelled 09 at its starting point (**runway threshold**) because it runs due east (90°), then it will be labelled 27 at the other end which is the runway threshold should the pilot need to land in a westerly direction (270°). In this way, when a wind reverses direction, landings and take offs follow suit. All runways are thus designated by two numbers the difference between which is 18. For example, on runway 13-31 pilots can either land or take off with a heading of 130° or 310°.

At international airports all runways must have **ground markings** and **standardized lighting** according to agreed international standards. The threshold and direction of a runway should be clearly marked as well as the **touchdown zone** and **distance markers** at various points to show a

pilot how much runway is left. The centre line should also be clearly visible as well as the **runway exits** leading to taxiways. Standardized lighting is as follows:

- Green **threshold lights** mark the beginning of a runway.
- Red lights mark the end of a runway.
- White or yellow lights mark the edges of a runway.
- Blue lights indicate taxiways.

Runway incursions

People often think that you are safe once you have landed on the runway and the pilot has slowed the aircraft down. In fact most accidents happen on the ground and not in the air. The world's worst ever civil aviation disaster (disregarding terrorist attacks) was the accident at Tenerife airport in 1977 when two Boeing 747s collided on a runway killing 583 people. As traffic increases at major airports, so do the risks of collisions on the ground.

A **runway incursion** is the unauthorized entry onto a runway by an aircraft, a vehicle, a person or an object. In such situations there is a serious danger to any airplane which may be taking off or landing. A clear illustration of this is the incident in Section 3 of the unit. A runway incursion might be caused by an operational error on the part of an air traffic controller, a pilot deviating from issued instructions or by the driver of an airport vehicle.

Miscommunication can be the cause or a key contributing factor in a runway incursion, as seen in the reading text in Section 1. Problems with the lighting or markings of runways or taxiways, or just a general disorientation or failure to see a situation correctly are other potential factors.

When a runway incursion occurs, there is often more than one factor at work. In 2001 at Milan's Linate airport, an MD-87 collided in fog on the runway with a Cessna corporate jet killing 118 people. The pilots of the corporate jet were unfamiliar with the airport and wrongly followed the instructions they were given, the air traffic controllers on duty failed to pick up clear signs that they were on the wrong course and though there was a **ground radar warning system** available at this frequently fogbound airport (which would have alerted all sides to the problem), it had not yet been installed (it has now).



for fun

When a pilot gets nervous ...

Beech Baron: Uh, ATC, verify you want me to taxi in front of the 747.

ATC: Yeah, it's OK. He's not hungry.

A Beech Baron is a small aircraft, usually with four seats, a 747 was, until very recently, the largest passenger aircraft. The initial instruction from air traffic control was quite normal. Taxiing behind a 747 could be very dangerous due to the jet blast from its engines.

RUNWAY INCURSION

Section one - Avoiding miscommunication

This section deals with the important area of miscommunication between pilots and controllers. It introduces key vocabulary which relates to the routine messages exchanged between pilots and controllers for aircraft manoeuvring on the ground. It teaches the language function of asking for information and provides students with an opportunity to talk about the importance of English in their professional lives.

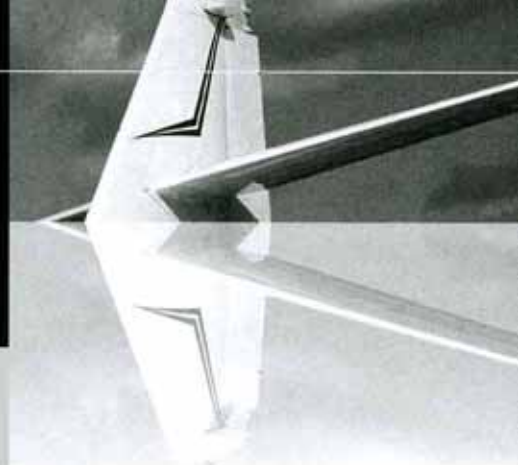
- 1 As air traffic increases and airports become more congested, ground operations at international airports are becoming more complex and this is an area of increasing difficulty for pilots and air traffic controllers (though the latter are at least familiar with their airport). As well as trying to taxi around an unfamiliar airport, a pilot may also have some difficulties communicating with the local controllers.

Students should have some interesting ideas to share on the two discussion questions. With regard to Question 2, they will probably also point out that miscommunication can be an issue between native speakers of the same language. If they don't mention this, you might like to prompt them to do so.

- 2 Note the example of the maintenance truck at the beginning of the article. Standard ICAO (International Civil Aviation Organization) phraseology is now *pass your message* rather than *go ahead*, to eliminate the possibility of such a dangerous misunderstanding.
- 3 Ask students to check answers in pairs.
 - 1 misunderstood
 - 2 misheard
 - 3 both the pilot and the controller
 - 4 do not involve
 - 5 very complicated
 - 6 simple English
- 4 (Suggested answers)
 - 1 Speak clearly / use standard ICAO phraseology at all times / be ready to rephrase if a pilot hasn't understood
 - 2 Situation 1: the controller should have said *pass your message*; Situation 2: could be avoided with a more complete message such as *hold short of runway 26*; Situation 3: could be solved by replacing the pronouns *he* and *we* with the call sign of the aircraft concerned.

Vocabulary – Communication

- 1 make
- 2 receive
- 3 give
- 4 read back
- 5 realize
- 6 repeat
- 7 confuse
- 8 give





Functional English – Asking for information

- 1 Before students begin this activity, you could review how questions are formed in the following tenses:

Present simple: (*do / does*) + subject + verb, e.g. *Do you fly?*

Present continuous: (*am / is / are*) + subject + verb (-ing form), e.g. *Are you flying?*

Past simple: *did* + subject + verb, e.g. *Did you fly?*

Present perfect simple: (*has / have*) + subject + verb (past participle), e.g. *Have you flown?*

Present perfect continuous: (*has / have*) + subject + *been* + verb (-ing form), e.g. *Have you been flying?*

Future: *will* + subject + verb, e.g. *Will you fly?*

You could also review forming questions with question words, e.g. *how, what, when, how much / often / long*.

Make sure the students know that some verbs will be used twice. For Question 3, *will* rather than *do* can be used if students want to talk about future intentions.

- 1 did
- 2 have
- 3 do / will
- 4 have
- 5 do
- 6 do
- 7 does
- 8 are
- 9 will
- 10 must

- 2 This is an interesting introductory activity at the beginning of the course, particularly if the students don't know each other well. Even if they do, it's a relaxed way of discussing some important issues. If time allows, students could change partners several times, conducting several interviews. For feedback, you can choose particular students and ask their peers to tell you one or two interesting things about them.

Speaking – English in aviation

(Suggested answers)

- 1 Probably disagree: most French airports have international flights. Even in an airport with no scheduled international flights, an aircraft may need to divert in an emergency, and clear communications in English will be vital. Some argue that there should be a policy whereby French controllers speak English to the French pilots so that foreign pilots in the vicinity can understand.
- 2 Possibly agree: Americans are sometimes criticized for not making enough effort to adjust their rate of speech, to use standardized expressions or to moderate their regional accents in order to be easily understood by the international aviation community.
- 3 Probably disagree: under ICAO regulations only a pilot who never crosses international borders is permitted to fly without English language certification.
- 4 Probably disagree: R / T phraseology is only sufficient in routine situations.
- 5 Probably agree: level 4, to be retested after three years, is the minimum required level. For younger controllers and pilots, level 5, to be retested after six years, or even level 6, certification for life, might be desirable and realistic aims.



Section two – Airport layout

This section deals with the difficulties for pilots in taxiing around JFK International Airport in New York, with a description of some particular areas of the airport which cause problems. The students listen to a controller talking about these problem areas. The section also introduces prepositions.

- 1 Before opening the Student's Book, ask students about the world's busiest airports and whether they have ever flown into them (if you are teaching pilots), or if they have passed through as passengers. You might then ask them about any experiences or knowledge they may have of the JFK Airport (e.g. *How many runways are there? (four)*). Then ask them to open their books and explain the task.

As well as providing practice in describing positions and use of prepositions, this activity familiarizes students with the airport diagram in preparation for the listening comprehension task.

- 2 01,02,03 Ask students what *hotspots* mean. In this context, *hotspots* are areas of an airport where there is a risk of pilots becoming confused when taxiing and a danger that they will take a wrong turning. Have students look at the five possible hotspots before listening.

1 D 2 E 3 C

01 Listening script

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 Listening script

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 Listening script

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.

- 3 01,02,03 Students may need to listen a third time if they are having difficulty, or you could choose to refer them to the listening script.

1 C 2 D 3 E 4 D 5 E

- 4 For trainees who do not have much first-hand experience, this activity could be set as a homework task. They could speak to their instructors or more experienced colleagues and report back on what they said to the class. Controllers who work in en route centres rather than airports may need to do the same thing.



Pronunciation – The ICAO alphabet

- 1 04 If students are unfamiliar with the concept of word stress in pronunciation, you could demonstrate where the stress lies on *Quebec* (second syllable).

You could either ask students to listen to the other letters and complete the table or to predict where the stress lies before listening.

oO	Oo	Ooo	oOo
H	Z, A	R, J	N, S

04 Listening script

Quebec
Romeo
Zulu
November
Hotel
Juliet
Sierra
Alpha

- 2 / 3 04 Students practise saying the ICAO alphabet. Note that these letters were chosen to be perfectly comprehensible even with a neutral stress pattern, which is the way they are often pronounced in practice.
- 4 This activity provides further practice of all the letters. Encourage students to maintain the correct stress patterns during this activity.

Vocabulary – Prepositions

Students could refer back to the original airport diagram for a fuller picture. You might need to explain that *taxi towards* means *in the direction of* whereas *taxi to* is an instruction to *go to that point*. Note that *runway holding position markings* refers to places where an aircraft must stop before receiving permission from the tower to cross a runway. An *active runway* is a runway which is in use at that time for landings or take-offs or both.

- 1 on
- 2 from
- 3 to
- 4 via
- 5 along
- 6 across
- 7 onto
- 8 into
- 9 At
- 10 ahead / on
- 11 towards

Speaking – Sketching out an airport

- 1 / 2 This activity provides students with free practice. With 1,100 movements per day, this will be a very busy airport. IFR / VFR implies that light aircraft (VFR traffic) as well as passenger jets (IFR traffic) will be using the airport. See the introductory notes to Unit 2 for a full explanation.

Students may ask additional questions, e.g. *How much land is available? How many runways are planned? What are the environmental constraints?* Suggest that they should try to be as cost effective, space efficient and environmentally friendly as possible.

You could do this activity in groups rather than in pairs if you think some of your students may struggle with it. Alternatively, students who are still having problems could describe an existing airport they know well. Preparation could also be set as a homework activity.

Allocate each pair or small group some time to present their plans to the class. Their presentation should prompt further questions and provide useful communicative practice.



Section three - Ground operations

This section deals with an incident relating to a dangerous runway incursion by a pilot who was confused and did not correctly follow his taxiing instructions. As well as further comprehension practice, the activities present and practise the vocabulary and language function for describing actions and position.

- 1 Runway incursions are one of the key safety issues at many airports. A rising incidence of runway incursions alerts experts to the risk of a serious accident. Students are likely to be aware of the seriousness of the problem. Nevertheless, some of their stories may be humorous, involving, for example, the appearance of unusual animals.
 - 1 An incident where an aircraft, a person or a vehicle mistakenly goes onto a runway that has been assigned for the landing or take-off of an aircraft.
 - 2 (Suggested answers): miscommunication, animals, pilot / controller error, construction work, unauthorized personnel, lack of visibility.
 - 3 (Suggested answers): improve communication as in recommendations from Section 1, improve security and maintain perimeter fences to prevent unauthorized personnel or animals from entering.
- 2 05 Tell the students that this listening is an example of communication problems during a runway incursion.

You could ask students to read the summary and predict or speculate on the likely answers. At the same time they should ask you about any vocabulary in the paragraph which is unclear. Ask them if they think that runway incursions are more likely to occur in marginal weather conditions. (Although it's easier to take a wrong turning in conditions of low visibility, in good weather conditions there might be a tendency to become complacent.)

marginal, inbound, active, takes off, stop, clears

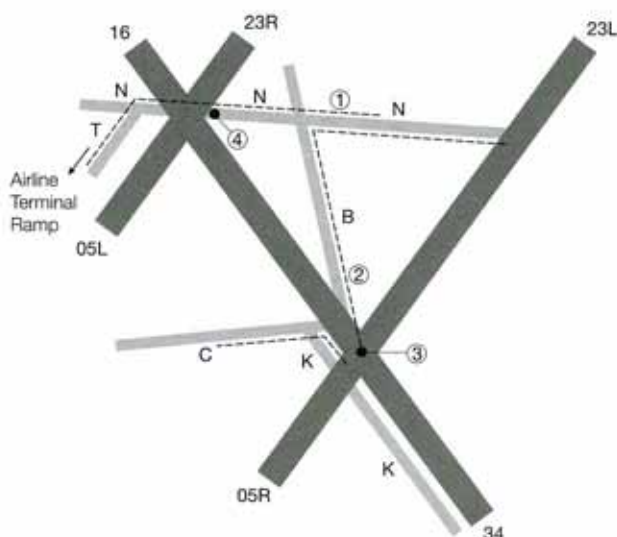
05 Listening script

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. ① 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 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.



- 3 05 After they correctly mark what happened on the diagram, you could ask how this incident could have been avoided. Students may choose to criticize the controller, the pilot or both. In this particular listening it seems that lighting and runway markings were not up to the required standard, so students may also talk about the responsibility of the airport authorities. If they seem particularly interested in the deficiencies in communication, you might direct them to the listening script for further analysis and discussion.



Pronunciation – Numbers

- 1 06 If you are teaching controllers, ask them if they have any call sign confusion stories to tell. Then get the students to complete the activity.
- 2 AQ629
 - 3 correct
 - 4 LN588
 - 5 HY5571
 - 6 JM422

06 Listening script

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

- 2 This activity provides additional practice with call signs. Students may be keen to practise further with their partner, dictating call signs of their own choosing.

Vocabulary – Verbs describing actions and position

Note that *push back* is the first movement an aircraft usually makes after starting engines. We can say colloquially that the aircraft or pilot pushes back or that the aircraft is pushed back (by a tug or truck). The latter is more technically correct as this is what actually happens (most aircraft cannot reverse under their own power).

Roll for take-off means that the aircraft is accelerating down the runway to generate enough speed to take off safely.

no movement	slow	fast
wait	approach	roll for take-off
queue	turn	touch down
face	push back	
	head	
	taxi	
	exit	

Functional English – Describing actions and position

Before students begin this activity, review the formation and uses of the present continuous tense:

Form: (am / is / are) + -ing form of the verb

Usage: the principal and most important use in pilot-controller dialogues is to talk about something which is happening at the moment of speaking.

It would also be a good idea to contrast the usage of the present continuous and the present simple tense. Ask students if their language contains a similar contrast in the use of present tenses (many languages don't).

- 3 's exiting
- 4 There are, heading
- 5 is facing, 's waiting
- 6 is rolling
- 7 is taxiing
- 8 there are, waiting
- 9 are moving
- 10 are standing
- 11 is pushing back
- 12 is approaching

Speaking

- 1 This activity rounds off the unit and allows students the opportunity to practise what they have learned in this section.
- 2 For Question 1 students might mention poor ground marking and lighting, obstruction to views, e.g. buildings, and increased traffic.



Section four – Language development

Functional English – Question forms

- 1
 - 1 When did you start your career in aviation?
 - 2 What aspect of your job do you enjoy most / most enjoy?
 - 3 Which airports have you worked at?
 - 4 How many hours a week do you usually work on average?
 - 5 When did you last experience a communication problem in English?
 - 6 How often do you have to attend training courses?
 - 7 How much language training will you have this year?
 - 8 How long did you train to do your job?

- 2 Students' own answers.

Describing actions and position

- 3
 - 1 is taxiing towards
 - 2 is exiting
 - 3 There is, taking off
 - 4 There are, standing
 - 5 is exiting
 - 6 is taxiing into
 - 7 are queuing
 - 8 is approaching
 - 9 is taxiing along

- 4
 - 1 landed on
 - 2 taxi from
 - 3 taxied along
 - 4 continued straight ahead
 - 5 went across
 - 6 taxiing into
 - 7 carried on towards
 - 8 came nose-to-nose

Vocabulary – Communication

- 1
 - 1 read back / repeated, misunderstood
 - 2 keep
 - 3 wait
 - 4 misunderstand
 - 5 issued
 - 6 responding, include
 - 7 mispronounces
 - 8 gives, repeat

Parts of an airport

- 2
 - 1 hotspot
 - 2 taxiway
 - 3 arrow
 - 4 blast fence
 - 5 signage
 - 6 pavement markings
 - 7 intersection
 - 8 terminal



PHOTOCOPIABLE ACTIVITY

This text is a true account of an incident where a baggage handler was trapped in the cargo hold, but was rescued before a transatlantic flight took off. A comprehension activity follows the text and then a discussion activity.

- 1 One sentence has been removed from each of the four paragraphs. Students have to correctly insert these sentences.

Key

Paragraphs 1, 2, 3: penultimate sentence
Paragraph 4: second sentence

- 2
 - 1 The last paragraph is deliberately vague. The two baggage handlers who were not rescued in time survived. Allow students to discuss the questions fully before telling them this.
 - 2 It is possible to survive as the cargo hold, which often carries pets, is pressurized.
 - 3 (Suggested answers): shock, exposure to cold
 - 4 Such incidents are rare but they should not happen at all. Let the students explain their ideas to the class for a system that ensures this is the case.



- 1 Read the text. One sentence is missing in each of the paragraphs. Mark the position where it should be inserted.

Baggage handler saved by his mobile phone

In December 2005, a 55-year-old baggage handler was trapped in the hold of an Airbus A330 at Dublin airport. The aircraft, with 325 passengers on board, had pushed back and begun taxiing towards the runway. The aircraft was bound for Los Angeles. Luckily, the baggage handler was able to use his mobile phone to call his company representative who then alerted the air traffic controllers. The cargo hold door was opened and the baggage handler released.

The incident occurred because the baggage handler, who was the leader of the team loading baggage for that flight, had entered the hold at the last minute to move some baggage. Not realizing that he was still inside, one of his colleagues shut the cargo hold door and gave the 'thumbs up' signal that the flight was ready to depart. The aircraft was cleared to push back and commence taxiing. It was only when the engines powered up that the baggage handler realized he was trapped.

The baggage handler was not injured though he was in a state of shock. It was thanks to the fact that he was carrying his mobile phone that he was able to raise the alarm and save himself from the traumatic ordeal of a transatlantic flight. In it, they recommended that procedures relating to last-minute adjustments or removals of items from the hold be tightened up.

While this incident was unusual, it is not the first time that it has happened. In March 2005, a trapped baggage handler flew for almost two hours from Chicago to Philadelphia in the cargo hold. In 2001, another trapped baggage handler flew all the way from Dallas to Puerto Vallarta, a three-hour flight. In both cases the men tried to escape before take-off by banging on the cargo door. They were not as fortunate as the man involved in the incident at Dublin airport.

Paragraph 1: They immediately informed the pilots who returned to the stand.

Paragraph 2: During push back the lights in the cargo hold remained on.

Paragraph 3: The final report on this incident was issued by investigators in April 2007.

Paragraph 4: In some cases the problem has not been discovered until a plane has landed.

- 2 Work in pairs. Discuss the following questions.

- 1 Do you think the two baggage handlers mentioned in the last paragraph survived their flights?
- 2 Would the Dublin airport baggage handler have been able to survive if the aircraft had taken off?
- 3 If a baggage handler can survive, what might the person's physical condition be on arrival?
- 4 How can such incidents be prevented?

NAVIGATION AND FLIGHT PLANNING

Introduction

In the very early days of powered flight, pilots were content simply to get airborne and fly short distances. It was not long, however, before they began to fly further and had a need to find their way safely and efficiently to their desired destination, thus leading to the development of **air navigation**. This was initially based on nautical navigation, hence the term **aeronautical**. Navigating a course in the air is fundamentally different from navigating on land or at sea, as one cannot simply stop in order to decide the best course to follow. An airplane can also only carry a limited amount of fuel and failure to reach its destination (or another safe landing area) before this fuel runs out might have fatal consequences (for more on this see Unit 10).

VFR / IFR

Nowadays all flights operate under **VFR (Visual Flight Rules)** or **IFR (Instrument Flight Rules)**. A VFR pilot is qualified and authorized to fly only in good weather conditions and is responsible for maintaining separation from other aircraft and obstructions on the basis of what he / she can see. An IFR pilot is permitted to fly in all weather conditions, when visibility may be low, and relies on **flight instruments** and **navigational aids** to follow a safe course. Most IFR flights take place in **controlled airspace** where air traffic control services issue instructions to pilots to ensure the safe and efficient flow of traffic. When you board a commercial flight, it is probably flying under IFR, but if a friend or relative offers to take you up in an airplane around your local area on a sunny day, then this is most likely flying under VFR.

Basic navigation (VFR navigation)

In the early days of flight, navigational aids did not exist and the basic technique followed was **pilotage**. Flights were at low altitude and the pilot simply looked out the window and navigated with reference to known landmarks. In some cases, it was just a question of following a road, river or railway to the desired destination. While a VFR pilot today will still use this technique, there is an obvious danger of getting lost, particularly if bad weather sets in suddenly. VFR pilots are nowadays advised to plan their flight carefully before taking off using the detailed **aeronautical charts** they have at their disposal. They plan their route, taking into account natural obstacles and airspace which may be restricted or controlled (they will either need prior authorization to enter or it may not be open to them at all). They then mark this route on their charts.

For all aircraft, and light aircraft in particular, wind is an important factor in flight planning. A pilot who tries to fly along a planned route risks being blown off course unless a suitable **heading** is chosen based upon meteorological forecasts of wind strength and direction. The chosen heading will probably need to be altered in flight in response to changes in the strength or direction of the wind. Note that the word **track** is also used to refer to the actual route taken by the pilot when, as frequently happens, the flight plan changes.

A **heading** is expressed in degrees with magnetic north as a reference. It should not be confused with the term **bearing**, also expressed in degrees, where an alternative reference is explicitly stated (e.g. a particular beacon). For example a pilot may be heading due west (a heading of 270°) having just passed directly over a beacon, in which case the pilot has a bearing of 180° in relation to this beacon.

A technique known as **dead reckoning** serves as a check that all is going to plan. The pilot selects some easily recognizable landmarks along the planned route and calculates how long it will take to reach these points taking into account both the planned airspeed and wind. These points are known as **checkpoints**, and when the planned time has elapsed the pilot expects to identify the landmarks on the ground. When this happens he / she has made a **fix** and can confidently proceed with the next stage along the planned route.

The **magnetic compass** is the basic navigational aid that a VFR pilot will use.

Despite all their training and the existing regulations, VFR pilots do get lost from time to time, fly into airspace that they shouldn't normally be flying in, or find themselves in **IMC (Instrument Meteorological Conditions)**, such as flying through cloud, for which they are not necessarily equipped or trained. The consequences are potentially very serious and it often falls to the highly skilled air traffic controllers or perhaps to other more experienced pilots who are flying in the vicinity to do what they can to help. A good illustration of an air traffic controller aiding such a pilot is to be found in Section 3.

IFR navigation

The first and most obvious difference in navigation procedures for IFR is that pilots need to be qualified and licensed to fly IFR.

IFR pilots usually fly in controlled airspace. They have at their disposal special charts which indicate recommended **IFR routes** between **navigational beacons** (radio stations



on the ground which emit signals). If they are travelling in remote areas where there are no navigational beacons, then they have to determine a suitable route by themselves. Distances between beacons, the bearings to be taken and the **Lowest Safe Altitude (LSALT)** are clearly marked for the recommended IFR routes.

If an IFR pilot is flying through controlled airspace, he / she needs to **file a flight plan** with air traffic control services. In the case of commercial airlines that repeatedly fly the same route, they would normally file a repetitive flight plan that is valid for a certain period.

Navigational aids

ADF (Automatic Direction Finding): ADF is a fairly old system of radio navigation, but it is still in use today. A **Non-Directional Beacon (NDB)** emits a radio signal and the pilot's cockpit display will show the direction of the beacon from the aircraft. This, combined with dead reckoning, is the system Jay Prochnow was using for his flight across the Pacific ocean which appears in the reading in Section 1.

VOR (Very High Frequency Omni-directional Range):

This is a more developed system and is currently the primary air navigation system in countries where sufficient infrastructure is in place. A VOR station can determine and transmit to the pilot the exact direction that will take the pilot over the point where the VOR station is. Many VOR stations also have **Distance Measuring Equipment (DME)** which informs the pilot of his / her distance from the VOR station.

GPS (Global Positioning System): Many cars are now fitted with a GPS system so that you can drive without consulting a map. Pilots are also now making use of GPS satellite navigation. Originally very expensive, GPS equipment is now cheaper to buy and so even if a light aircraft is not fitted with a GPS cockpit system, many pilots will use a hand-held device. Had Jay Prochnow been flying today with such a system available, he would not have come so close to disaster.

One of the benefits of GPS is the greater degree of precision that it affords to both pilots and controllers. A pilot's position can now be identified within a few metres. For this reason, required minimum levels of separation between airplanes are less nowadays than in the past.

One of the criticisms of GPS is that it was developed and is owned by the US military. It has been freely available for civilian use for several years, but the worry that one day this might change has led the Europeans to develop their own new satellite navigation system, **Galileo**, which is expected to be operational in a few years' time.

Air traffic control

IFR pilots can obviously not follow their desired course blindly while disregarding other traffic. When flying through controlled airspace a pilot will often ask for or receive **vectors** (instructions as to which heading to take, or we can say that the controller **vectors the pilot**) from an air traffic controller who is responsible for ensuring and maintaining safe separation between aircraft.

for fun



When things go wrong ...

Student pilot: I'm lost; I'm over a lake and heading toward the big E.

Controller: Make several 90° turns so I can identify you on radar ... OK then. That lake is the Atlantic Ocean. Suggest you turn to the big W immediately ...

The pilot is VFR, and the request on the part of the controller that he / she make 90° turns is a commonly used technique in such cases for quick and sure radar identification. 'The big E' and 'the big W' refer to the large letters displayed on the compass – East and West.

LOST

Section one – Across the Pacific

This section introduces the true story of a pilot, Jay Prochnow, who gets lost while crossing the Pacific Ocean on a solo flight in a single-engine plane. The section teaches the key vocabulary of air navigation and the language function of explaining abbreviations. It also sets the scene for Section 2 in which Jay Prochnow is rescued through the efforts of a commercial airline pilot who picks up his distress call.

- 1 The picture and the question should arouse students' curiosity. Flying a light aircraft like this with one engine over long stretches of water is not recommended. You might receive some strong reactions, particularly if you are teaching airline pilots (or trainee airline pilots) whose training emphasizes the importance of avoiding any kind of risk. Air traffic controllers (or trainees) are likely to react in a similar way. It is likely that the students will be intrigued by the situation and motivated to talk about the risks involved.

(Suggested answers)

The aircraft can't carry much fuel, which limits how far it can fly at once.

The aircraft doesn't have sophisticated navigational aids.

There are few landmarks for navigation.

The aircraft only has one engine.

There are few places to land in an emergency.

- 2
- | | | | |
|---|-----------|---|-------------|
| a | endurance | e | track |
| b | chart | f | destination |
| c | en route | g | fix |
| d | compass | h | calculate |
- 3 This text should be clear and the aviation vocabulary is straightforward or has been defined in Activity 2. *HF signals* stands for high frequency signals. You might need to respond to vocabulary questions of a general nature.

(from top to bottom)

Oakland

Hawaii

Pago Pago

Onu-I-Lau

Norfolk Island

- 4
- 1 Cessna 188
 - 2 22 hours
 - 3 15 hours
 - 4 110 knots
 - 5 0300
 - 6 1,500 nm





- 5 Students read the text a second time and answer the questions to make sure they have understood. They might wish to discuss the situation or you could prompt a discussion with some supplementary questions, e.g. *What will happen if he runs out of daylight?* (Navigation becomes impossible and he probably has to ditch in the ocean with little chance of survival.) *How serious is the problem?* (Extremely serious as he's running out of daylight.).

- 1 An aircraft sales company in Oakland
- 2 Charts, a compass and an ADF
- 3 To give maximum daylight hours.
- 4 There were no navigational aids.
- 5 When he couldn't see Norfolk Island.

- 6 If you wish to vary the activity, ask students to close their books and work in pairs or small groups to brainstorm the advice they would give to pilots like Prochnow.

(Suggested answers)

Carry a GPS device.

Be patient and wait for the best meteorological conditions (completely clear skies, a following wind).

Contact other pilots who have flown a similar route for advice.

Bring some strong coffee to help keep you awake at all time.

Functional English – Explaining abbreviations

- 1 Students could complete the activity in groups A and B to ensure they have the correct answers before beginning the information exchange activity.

NDB = Non-Directional Beacon, ADF = Automatic Direction Finder, VFR = Visual Flight Rules

- 2 Encourage students to help their partner with hints (e.g. giving the first word). To feed back on this activity ask students to explain the abbreviations that you don't know (or are not sure of). This could be an authentic and useful exchange of information.

DTG	distance to go
FAF	final approach fix
FDR	flight data recorder
OAT	outside air temperature
RVR	runway visual range
TAS	true air speed
TBS	to be specified
TOGA	take off, go around
ZFW	zero fuel weight
ILS	instrument landing system



Section two - Finding flight N45AC

This section deals with the rescue of Jay Prochnow. Students listen to the initial contact he made with Auckland air traffic control and the subsequent assistance he received from Captain Vette. The listening activity outlines the considerable aid he received and forms an interesting and challenging listening comprehension activity. Later in the section students practise giving and receiving co-ordinates as well as the pronunciation of regular past tense endings.

- 1 This is a warm-up activity prior to listening. The aim is for the students to discuss the possible order of events and review some of the key parts of the pilot-controller dialogue.
- 2 07,08,09 *Mayday. Mayday. Mayday.* is the standard phrase for declaring an emergency. Note that pilots may sometimes contact a controller with a problem but not actually need to or wish to declare an emergency (when in doubt, a controller will ask *Are you declaring an emergency?*). Once an emergency has been declared, all possible assistance will be provided to a pilot, whether from air traffic control services or other pilots who pick up the emergency call.

1 d 2 e 3 a 4 b 5 c

07 Listening script

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.

(U)

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 Listening script

V Turn towards the sun and report your heading.

P Wilco. **(U)** 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. **(U)** N45AC. It's getting dark. What time is your sunset?

P The sun is setting now, and it is 0752 zulu.

09 Listening script

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 coordinates are 31° south, 170° 21' east. You are 150 miles from Norfolk Island.



- 3 07,08,09 Even allowing for the fact that pilots will always help each other out, the assistance provided by Captain Vette was quite remarkable. He agreed straightaway to incur a significant diversion of his passenger flight in order to search for Prochnow. He also had little information to go on, making the search very difficult. The navigational techniques he used to determine Prochnow's approximate position were highly innovative and effective. Note the word *transponder* in Question 4. This is the onboard device which allows aircraft to be identified on a controller's radar. Even if Jay Prochnow's aircraft was equipped with a transponder it would not have been any use in the remote area he was flying in as radar coverage was not provided. Had there been radar coverage in the area, an air traffic controller would have been able to give him his precise position and help him to navigate safely to his destination.

1 b 2 a 3 b 4 a 5 a

Vocabulary – Co-ordinates

- 1 08,09 Note that according to standard ICAO phraseology, the following numbers have special pronunciations in aviation English: 3 *tree* 4 *four* 5 *five* 9 *niner*. Numbers are of critical importance and the aim is that there is no ambiguity in this area. *Five* and *nine* could be confused. The *th* sound is difficult for many nationalities to pronounce and hence *tree* instead of *three*. That said, many pilots and controllers (native English speaking or foreign) do not incorporate these variations when they communicate on the frequency.

- 1 274°
- 2 5.6° east
- 3 30° south
- 4 31° south 170° 21' east
- 5 150 miles

- 2 10 Students repeat the directions and co-ordinates.

10 Listening script

north
south
east
west
south-east
north-west
south-west
north-east
274°
56° east 30° south
170° 21' east
14° 32' 40. 25° north

- 3 Exact positions on the globe are stated longitudinally and laterally with the Earth's surface divided into 360° around each axis. Each degree is divided into 60 minutes and for further precision a number of seconds can also be stated.

In this pair-work information exchange activity, it is important that students communicate numerical data accurately. Monitor students' rhythm and offer them advice on improving it as necessary.

Pronunciation – Regular past tense endings

- 1 11 Correct pronunciation of the *ed* past tense ending is difficult for many nationalities and it is important in preventing a possibly serious miscomprehension. Make sure all students can hear and reproduce the three basic sounds before moving to the next activity.

11 Listening script

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

- 2 You could do this activity with the whole class. Encourage students to say each verb. You could model one or two verbs if they can't agree, but students should be able to complete the table without help.

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

- 3 12 After successful choral repetition, you might elicit some other regular verbs and ask students which group they belong to.

12 Listening script

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

- 4 In this activity students practise reproducing the correct past tense endings in context.



Section three - Lost

This section deals with a situation where a pilot who is qualified to fly only VFR ends up lost in IMC (Instrument Meteorological Conditions). This is a frequent and dangerous occurrence, especially with inexperienced pilots or student pilots flying solo. Often it is the air traffic controller who rescues the pilot by guiding him / her to safety. As well as providing further relevant listening comprehension practice for the students, the section focuses on the vocabulary needed to describe landmarks and also on the functional language of confirming and disconfirming.

- 1 Before beginning this activity, review vocabulary for geographical features. Have students keep their books closed and ask them the following question: *What geographical features can help a pilot navigate visually?* Write their suggestions on the board, supplying the vocabulary yourself when necessary.

Then students work in pairs or small groups to complete Activity 1. Be ready to explain any words they are not sure of.

- 1 built-up area
- 2 lake
- 3 high ground
- 4 mast
- 5 reservoir
- 6 valley
- 7 woods
- 8 fields
- 9 highway
- 10 power lines
- 11 coast

- 2 13 To provide students with vocabulary revision before completing the table, ask them to close their books and elicit answers to the following question: *What is the most important information a disorientated pilot needs to give ATC?* (Altitude – the pilot could be dangerously low depending on the terrain – and endurance should be high on their lists. Note that controllers are required to ask how many passengers are on board.)

- 1 15
- 2 south-east
- 3 Beech Baron
- 4 3,000
- 5 110
- 6 780
- 7 8
- 8 1, 30 minutes

- 3 14 For less confident classes, play the recording once and ask the students to just listen. Then play the recording again pausing at regular intervals to give them time to answer.

woods, fields, road, valley, river, reservoir, communications mast, high ground

13 Listening script

P = pilot, C = controller

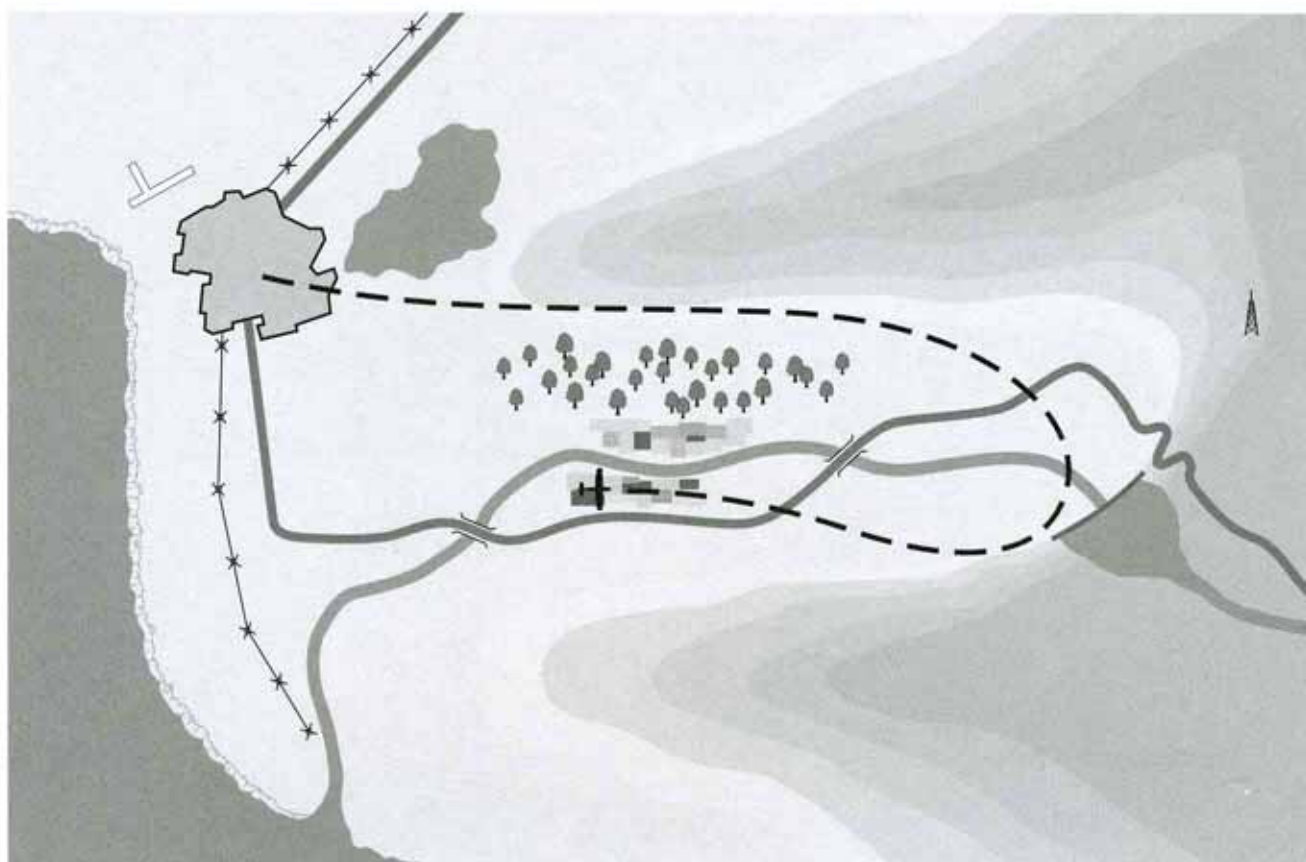
- P** MAYDAY. MAYDAY. MAYDAY. TJB.
C TJB. Pass your message.
P MAYDAY. MAYDAY. MAYDAY. We're lost.
C TJB. Say last known position.
P Last known position was 15 miles south-east of CELRA VOR. TJB.
C TJB. Roger, last known position 15 miles south-east of CELRA VOR. Remain straight and level.
P I'm straight 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 Listening script

- 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 a 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?



- 4 14 Get students to listen again and draw the pilot's path on the map. In large classes, students could work in groups, then exchange their maps with other groups to check their answers.



Functional English – Confirming and disconfirming

- 1 14 You could review the sentences with the students before listening to the dialogue and get them to predict the answers. After completing the activity, you could review question formation with students.

1 Can 2 Confirm 3 Can 4 Is 5 Can you clarify 6 Can you see

- 2 14

2 ✓ 3 ✓ 4 ✓, then ✗ 5 ✗ 6 ✓

- 3 14 As well as an effort on the part of the controller to speak more slowly and clearly (as in this example), rephrasing or a reformulation can also help when the pilot is having difficulty understanding (or vice versa). Most controllers and pilots who are speaking English as a foreign language do this automatically. Controllers and pilots who are native English speakers, on the other hand, are sometimes criticized for their lack of sensitivity when checking, confirming and clarifying instructions. You could discuss with your students some of their experiences and difficulties in this area.

(2) is slower and clearer. Requests to confirm information must be spoken slowly and clearly.

Speaking

This is a free practice activity. Explain to students that they will reuse the language they have studied in this section and that they should confirm, check and clarify the information given by Students A and B. When they have done the activity once, you might like to change pairs and change roles and do it again. You can add an extra challenge this time by telling the pilots to deliberately read back wrongly one of the controller's instructions.



Section four – Language development

Functional English – Simple past

- 1**
- 1 made
 - 2 happened
 - 3 reported
 - 4 departed
 - 5 flew
 - 6 did not reach
 - 7 landed
 - 8 believed
 - 9 was
 - 10 were not
- 2**
- 1 Why did you make
 - 2 When did you notice
 - 3 Did you decide
 - 4 Why did you land
 - 5 How did the fire start
 - 6 How many passengers did you have
- 3**
- 1 took place / happened
 - 2 avoided
 - 3 detected
 - 4 steered
 - 5 was
 - 6 was
 - 7 crossed
 - 8 took place / happened
 - 9 issued
 - 10 blamed
 - 11 didn't tell

Confirming and disconfirming

- | | | |
|----------------|----------------|----------------|
| 1 Say last | 4 what you | 7 Negative |
| 2 that correct | 5 can see | 8 give further |
| 3 Affirmative | 6 Confirm that | |

Vocabulary

- 1**
- | | | |
|-----|-----|-----|
| 1 d | 4 i | 7 e |
| 2 b | 5 h | 8 c |
| 3 g | 6 a | 9 f |
- 2**
- | | | |
|-------------|----------------|-----------|
| 1 Maintain | 4 lose | 7 box |
| 2 establish | 5 turn | 8 contact |
| 3 maintain | 6 re-establish | 9 getting |
- 3**
- type of land: high terrain, marshland, desert, plain, farmland, urban area
- feature: bridge, footpath, cemetery, harbour, lighthouse, ridge

PHOTOCOPIABLE ACTIVITY

This is a role-play activity where the students work in pairs. First Student A is a TV journalist interviewing Jay Prochnow and Student B is Jay Prochnow. Then Student A is Captain Vette and Student B is a TV journalist.

Before students start, review what happened to Jay Prochnow and how Captain Vette rescued him (Sections 1 and 2). Students will then need ten minutes' preparation time to do the activity and to think of two additional questions. With more confident classes, you can explain that they are not obliged to follow the script.

If you have access to recording equipment, you could video the students' interviews. You should seek your students' agreement if you plan to do this.

Key

Questions for Student A

- 1 Why were you flying for such a long distance across the ocean?
- 2 What special preparations did you make for this flight?
- 3 When did you realize you were lost?

Questions for Student B

- 1 Why did you ask Jay Prochnow to fly towards the sun?
- 2 How did you establish his exact position?
- 3 What advice did you give him?



Role card for Student A

First you will play the role of a journalist. You are going to conduct an interview with Jay Prochnow. Look at the words below and put them in the correct order to make questions. Then write two more questions. After you finish the interview you will play the role of Captain Vette and answer your partner's questions. When you and your partner are both ready, conduct the two interviews. You may choose to ask additional questions depending on the responses you receive.

1 a / across / distance / flying / for / long / ocean / such / the / were / why / you

_____?

2 did / flight / for / make / preparations / special / this / what / you

_____?

3 did / lost / you / realize / were / when / you

_____?

Additional questions:

_____?

_____?

Role card for Student B

First you will play the role of Jay Prochnow and answer your partner's questions. After you finish the interview you are going to play the role of a journalist. You are going to conduct an interview with Captain Vette. Look at the words below and put them in the correct order to make questions. Then try to write two more questions of your own. When you and your partner are both ready, conduct the two interviews. You may choose to ask some additional questions depending on the responses you receive.

1 ask / did / Jay Prochnow / to / fly / sun / the / towards / why / you

_____?

2 did / establish / exact / his / how / position / you

_____?

3 advice / did / give / him / what / you

_____?

Additional questions:

_____?

_____?

Introduction

The speed of technological development during the twentieth century was fully reflected in the aviation world, whether it was in terms of aircraft development, flight control systems or systems for controlling air traffic. The fast pace of change continues today. One of the most interesting, though controversial areas, is the development of automated systems.

Fly-by-wire

For the earliest aircraft, **flight control systems** were solely **mechanical** (using rods, cables and pulleys). The pilot in the cockpit made use of a **control stick** and **pedals** to carry out the three basic aerodynamic movements – **roll**, **pitch** and **yaw** (see Unit 5 for a description of these). As aircraft got bigger, systems became **hydraulic** (using pumps, pipes, valves and actuators), so that pilots could move the important control surfaces without having to rely on their own strength. The development of these hydraulic systems was also an important way for the engineers to keep the weight of the aircraft down. As aircraft continued to grow in size and with the development of large passenger jets, this requirement to keep weight down led to the development of **fly-by-wire** systems. Fly-by-wire means that the aircraft is controlled by an electrical system. Nowadays fly-by-wire systems are digital and large aircraft are controlled by a computerized command system. The world's first digital fly-by-wire aircraft was the Airbus A320, which made its maiden flight in 1987. The greatest innovation was the in-built safety feature in which the computerized system prevented pilots making what would normally be considered unsafe manoeuvres (taking the aircraft outside **the flight envelope**). While this was the subject of much debate at the time, it is now a standard feature of all new Airbus aircraft. Boeing was also developing digital fly-by-wire systems, but their systems allowed the pilots to take the airplane outside the flight envelope in an emergency situation. Thus there was a fundamental difference in philosophy between the two major constructors, Airbus and Boeing, which still exists to some extent today. The advantages and disadvantages of both approaches are discussed fully in the listening activity in Section 2.

An obvious question is what happens when the computer fails (**instrument blackout**) as happens in the incident featured in Section 3. The pilot then has no control over the aircraft (a back-up hydraulic system would increase weight significantly). Large aircraft usually have at least four parallel

computerized control systems to deal with situations where one or even two computers might be down.

With sophisticated computer controls in place, there is no longer any need for a control stick in the cockpit. Yet even the newest aircraft (the Airbus A380 or the Boeing 787) have something which resembles a control stick in the cockpit. Research conducted amongst pilots has shown that this should remain for reasons which have nothing to do with technology and everything to do with human psychology.

Automation in ATC

The computerization of cockpits led experts to question whether it was necessary for air traffic controllers to always give **verbal instructions** to pilots and whether there would be any benefits in a system where controllers sent messages electronically – **Datalink** systems. Such systems are currently under development and already in use to some degree. For example, in many parts of the world, **meteorological updates** are now sent this way (previously they would have been read to pilots).

There are generally recognized benefits for both safety and efficiency. Potential misunderstandings are a natural feature of all verbal communication. Pilots and controllers face this danger when they speak to each other and are urged to constantly check, confirm and clarify information. An instruction given by a controller should normally be **read back**. As well as the potential for important mistakes being made, this is a rather inefficient use of time where messages can be submitted electronically. Other advantages and disadvantages in using Datalink systems are outlined in the reading text in Section 1.

More controversial has been the idea of **free flight**, with research having been conducted into fully automated ATC systems. The improvements in flight control systems have led to considerable reductions in the workload of pilots during the **cruise phase** of flight, which can often be entirely conducted by the **autopilot**. The advent of GPS has also meant that pilots are now much surer of their precise positions in the sky. The basic idea of free flight is that pilots would become responsible for plotting their optimal route and working out their own separation from other aircraft through direct pilot to pilot communications. Air traffic controllers would intervene only when necessary to resolve conflicts. Free flight has been investigated as a model for **en route** traffic above certain flight levels with arrivals and departures at airports still subject to normal ATC procedures.



Debate continues as to the feasibility of such a solution. In the US the increased **efficiency** that it could provide (in terms of allowing pilots to choose more direct routings) is often cited. In Europe, skies are more crowded and air traffic controllers are generally unionized and opposed to a measure they see as designed to save money at their expense. In response to such criticism, advocates of free flight say that controllers will still be needed, simply that the nature of their job will change. At present, implementation of any free flight system is unlikely in the near future.

Pilotless airplanes

Even more unlikely in the near future is the idea that an airliner might take off with no pilots on board, though airlines would save a lot of money by not employing pilots. In fact the technology is almost in place for this to be feasible. Commercial flights can and often do conduct the entire cruise and landing phases on autopilot. Take-offs are manual for the simple reason that current research indicates that the decision to take off or to **abort** take-off is still best made by a trained human pilot. Once this last remaining problem is addressed, the only argument resting against the implementation of pilotless commercial flights will be the reaction of passengers and their likely refusal to board such aircraft. Most experts believe that pilotless airplanes will one day be used but not in the near future. For the moment, pilotless airplanes are not something airlines or pilots are talking about publicly. Though no mention is made of this possibility in the unit, your students may well raise it, particularly during the speaking activity at the end of Section 1.

Safety and human factors

For years it was assumed in the world of aviation, as elsewhere, that humans were somehow more reliable than machines. This is no longer the case. While machines and systems do fail from time to time, nearly all accidents in civil aviation in recent memory have been the result of human error. For a full discussion of human factors see Unit 6.

Great progress has been made in ensuring the safety of civil aviation. Accident rates have steadily decreased throughout the history of flying and it is the safest form of transport (a cliché often repeated but, nevertheless, true). The continuing challenge is to make flying even safer. Any accident is a tragic event for those involved and their relatives. Images shown by the media have a very negative effect on the travelling public. As the number of flights increases, the number of airplane crashes appearing on the news will logically increase too, even if the very low rate of accidents remains constant. It is the opinion of most experts that there are gains in safety to be made from technological developments.

An example of an accident which could have been averted due to available technology was provided by the tragic mid-air collision of two airplanes over Uberlingen, southern Germany, in 2002. Both aircraft were equipped with **TCAS** (Traffic Collision Avoidance System). This system not only informed both pilots that there was an aircraft nearby but also issued **avoidance instructions** to both cockpits, telling one pilot to climb and the other to descend. The problem was that one pilot followed an instruction from the air traffic controller (who was distracted at the time) and unfortunately both aircraft descended at the same rate and collided. Following this accident, a clear directive was issued to air crew worldwide that a TCAS instruction must always take priority over a conflicting instruction from ATC.

for fun

The aircraft of the future

Future commercial airliners will require just one pilot and a dog. The job of the pilot will be to enter the cockpit and reassure the passengers with his / her presence. The job of the dog will be to keep an eye on the pilot and make sure he / she doesn't try to touch any of the controls.

This is a very old joke but as technology develops further it becomes even more relevant.

TECHNOLOGY



Section one – Datalink

This section introduces a discussion on the subject of Datalink. It summarizes the current debate in the text and also introduces key vocabulary for communications. It also presents the language function of expressing purpose.

- 1 Some features of Datalink communications (the most routine messages) are already in use in many parts of the world. Even if students work in an environment where they don't use any Datalink messages, it is likely that they will have heard of some applications.
- 2 Students may mention that full implementation of Datalink is expected to increase capacity through greater efficiency of communications. If you are working with controllers, they may not necessarily see this as an advantage. On the contrary, they may point out that more aircraft in already crowded skies could be a threat to safety. This is a controversial issue which may generate a lively discussion.

(Suggested answers)

Advantages: communication errors are reduced, the ATC can communicate clearly, it reduces airspace congestion

Disadvantages: controllers and pilots sometimes misunderstand free messages, pilots do not have time to write and read free messages in an emergency, messages can get out of sequence, if Datalink and voice are used, the crew's attention is divided

- 3 Students may react strongly to the point made in the text about pilots and controllers being able to write *free text messages* in non-routine situations. They are unlikely to agree that this is a good idea (whether you are dealing with pilots or controllers). Current practice throughout the world is that emergency situations will always require voice communications. You can point out (or elicit from the students to check their comprehension of the text) that the writer concluded that voice communication is best in an emergency situation.
- 4 Sentence 1 is partially true in that Datalink does reduce voice communication. The major debate is to what extent it could do so, and no estimate is provided in the text. The text mentions the use of abbreviations (Sentence 4), but these would be expected to appear in free text messages and are not a feature of the routine pre-formatted messages.

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

- 5 This question could lead to a lively debate about Datalink. The main reason for introducing Datalink is to improve the efficiency of the air traffic control system. Some people claim that increased efficiency might lead to a reduction in safety standards. People who support the introduction of Datalink reject such claims. It is possible that some of your students might have strong views on the subject.



Vocabulary – Communications

In larger classes, get students to work in pairs and then check their answers in groups. With less confident students, you could do this activity with the whole class.

- 1 transmissions
- 2 congestion
- 3 frequency
- 4 environment
- 5 clearance
- 6 sequence
- 7 capacity
- 8 heads-down time

Functional English – Expressing purpose

- 1 When students have completed the sentences, present the three different structures below, telling students that it is the grammar which differs rather than the meaning:

- *for* + verb (-ing)
- *(to / in order to)* + infinitive
- *so that* + subject + verb

To practise these structures in a controlled way, ask students to think about some equipment they use in their job. Then tell them to make three different sentences, similar in meaning, but using each of the three structures above.

- 1 for
 - 2 to
 - 3 in order to
 - 4 so that
- 2
- 1 for
 - 2 to / in order to
 - 3 so that
 - 4 in order to / to
 - 5 for
 - 6 to / in order to
 - 7 so that
 - 8 in order to / to

Speaking – The perfect technology

This activity gives the students the opportunity to be creative. As they work, monitor and help with vocabulary. When reporting back on their ideas they should use the language for expressing purpose in the Functional English section. Some groups may mention either *free flight* or *pilotless aircraft*, thus dealing with the problems of pilot-controller communications by eliminating either controllers or pilots. For more background information on these concepts, see the introductory teacher's notes to this unit. If students do not mention these points, you could introduce them into the discussion.



Section two - Flight control systems

This section deals with a debate on the subject of flight control systems and discusses to what extent they should be automated. Students listen to pilots comparing the flight control systems of two well-known aircraft. The difference in these systems reflects a debate which has taken place between the two major constructors, Airbus and Boeing. The section teaches the language function of rephrasing and vocabulary for safety. Finally students practise the sounds /b/ and /p/.

- 1 Note that the Airbus A320 is famous as the first fly-by-wire passenger jet to enter into service, in the late 1980s. This new flight control system for civil aviation caused quite a controversy at the time, particularly the override feature (discussed in Activity 3 below).
1 C 2 B 3 A
- 2 When answering Question 1, the students may interpret *fly-by-wire* differently. Some will think of it as a system where the technology has ultimate control, others will consider that the pilot can always override the commands. This point will be explored fully in the listening activity which follows.
- 3 Pilots of civilian passenger aircraft are trained to fly safely at all times and to avoid any kind of risk, no matter how minimal. For this reason there are strict limits on the manoeuvres they are permitted to perform. They are obliged to keep within these entirely safe limits, in other words to remain within the *flight envelope*. Their aircraft has the *capability* to fly outside this pre-defined flight envelope, but it is only test pilots, flying the aircraft without any passengers on board, who are authorized to do so. When the flight control system itself prevents a pilot from moving outside the flight envelope, we can say that there are *built-in limits*. A system which allows the pilot to exceed these built-in limits in exceptional circumstances grants the pilot *ultimate control*. To exercise this ultimate control, the pilot needs to be able to take the decision to *override* the flight control system, though this should be an extremely rare decision.
1 ultimate control
2 capability
3 built-in limits
4 override
- 4 15 An airline usually consults its experienced pilots before any decision to purchase new aircraft. Buying aircraft is the biggest investment that any airline makes and it certainly wishes to have the support of its pilots.

Feedback from pilots is also sought by constructors when they are developing a new type of aircraft. The investment of constructors is even greater, and while the potential customer is the airline, the constructors know that no aircraft can be considered as suitable for purchase without the support of pilots. Note that the Boeing 777 and the Airbus A320 are also very different in terms of their capacity and range. The B777 carries more passengers and is a long haul aircraft while the A320 is for short haul use. If you are teaching pilots, you could ask them to define their dream aircraft and their ideal flight control system.

Whether teaching pilots or controllers, they may be interested in comparing the new Airbus A380 with the new Boeing 787. Both aircraft are for the long haul market but there are major differences in their conception, representing different visions of how civil aviation will develop in future years. This could lead to a very lively debate.

- 1 Because they are going to upgrade their fleet and Jean wants an experienced pilot's opinion on the two options.
- 2 Airbus 320 and Boeing 777
- 3 As examples of the advantages and disadvantages of built-in protection.
- 4 He thinks they are both extremely safe.



15 Listening script

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.

5 15

- 1 fly-by-wire
- 2 pilot
- 3 pull up
- 4 keeping the speed brakes on

Functional English – Saying things another way

- 1** **15** This is of particular importance for pilots and controllers, as they need to rephrase what they say when they are not understood the first time, or simply confirm that they have been understood. After completing the activity you could ask them to describe a situation where they would need or have needed such language.

- | | |
|-----------------------|------------------|
| 1 explain what, means | 5 you give me |
| 2 sure what you | 6 That is |
| 3 other words | 7 it another way |
| 4 basically | |

- 2** It is likely that your students use the same communication systems. If this is the case, ask one of them to play the role of someone who doesn't understand and to ask a lot of questions for clarification.

Vocabulary – Safety

- 15** Multiple answers are possible so emphasize to the students that they need to listen carefully for the combinations used in the listening. As a vocabulary extension activity, you could also ask them to explore the alternative combinations that could occur in another context (e.g. *avoid anything dangerous, limit the pilot's capability, etc.*).

- | | | |
|------------|-----------|-----------|
| 1 do | 4 prevent | 7 allow |
| 2 increase | 5 make | 8 limit |
| 3 stop | 6 reduce | 9 prevent |

Pronunciation – /b/ and /p/

1 16

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

16 Listening script

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

- 2 / 3** **16** While making the distinction between these sounds is easy for some students, others find it difficult. You could try the following technique to help them understand the difference:

Hold a piece of paper in front of your mouth. When you make the /p/ sound it should move, but when you make the /b/ sound it should stay perfectly still. Try this with the words in the activity.

- 4** You could ask students to record themselves saying the sentences after they have practised them. When they listen to their recordings, ask them if they are satisfied that they have produced the /p/ and /b/ sounds correctly. If they think they can do better, let them make another recording.

Speaking

For Question 1, students will probably say that both systems are now accepted as being perfectly safe. While small aircraft continue to use mechanical control systems, the extra weight involved would not be appropriate for a modern jet airliner.

For Question 2, students might talk about the possibility that commercial aircraft may be flying without pilots on board in fifty years' time. See the introductory teaching notes to this unit for more discussion of this.



Section three - Instrument blackout

This section features an incident in which an electrical failure occurred with the temporary loss of flight control systems. While it seems to be quite a frightening situation, modern aircraft have multiple back-up systems to cope with such an event. The section teaches the language function of giving instructions and students practise sentence stress.

- 1 Ask students to work in pairs and discuss the following questions: *What can a pilot do when instruments on board fail? What kind of back-up is available on fly-by-wire aircraft in the case of a system failure?*

Note that it is easier to generate discussion in large classes in response to such open-ended questions, as there is more chance that some students will have interesting knowledge or experience to share with the group. In a small class, there is a possibility that no one has anything to say. It is a good idea in a very small group to have back-up questions available. You will quickly get to know students well in a small class and thus you can prepare questions or activities tailored to their specific needs.

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

- 2 You can feedback on this activity by asking the students to explain the function of each item to you. This is a good way to check if they are capable of explaining these items to a non-specialist, and you may also find that it greatly improves your own knowledge of the cockpit systems. Encourage the students to use the language used to express purpose, studied in Section 1, and the language of rephrasing, studied in Section 2.

upper / lower ECAM displays – a system in Airbus cockpits that allows the crew to monitor aircraft systems and any failures that occur

autopilot – a system that automatically calculates the amount of thrust needed

radio management panel – a set of controls for managing radio communications

primary / secondary flight displays – computer screens that allow the crew to monitor essential flight data such as attitude, air speed, etc.

speed, altitude and attitude display – a computer screen that allows the crew to monitor this data

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

- 4 17 This initial comprehension activity is designed to check that students have understood the main events. Note the phrase to *enter a holding pattern*. This means that the aircraft will not land immediately, but will wait (circling) until the pilots have checked that everything is OK to land.

1 b 2 a 3 c

17 Listening script

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. (ii)

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.

- 5 17 This activity provides practice in understanding the details of what happened. You may wish to get students to work in groups to answer the questions. If necessary, play the recording a third time.

- 1 Because they are flying at night and the flight deck lights are not working.
- 2 The autothrust, autopilot, flight deck lighting and primary flight displays
- 3 Because the aircraft radio has no power.
- 4 On the lower ECAM screen
- 5 Nine



- 6 Equipment used by both pilots and controllers is becoming more and more reliable and it is possible that your students never experience technical problems at work. In this case, students should still be able to answer part 2 of Question 1 in relation to technology at work, because there ought to be procedures in the case of equipment failure (even if it never fails).

Functional English – Giving instructions

- 18 Note that the language used in the dialogue is very direct. Imperative forms and simple but clear sequencing connectors are used. This is typical of an emergency situation where pilots need to think and react quickly.

When students have finished the activity, review the following grammar points:

- The difference between *try to do* and *try doing* something: the former is used when you make an effort to do something which is difficult, but you might not actually be able to do it. The latter is used when you experiment by doing something in order to see whether or not it will solve your problem.
- The imperative form of the verb (the same as the infinitive form)
- Sequencers: *first* (when you begin) / *next – then – after that* (all similar meanings) / *finally* (when you finish) / *before – after* (opposite meanings)

- 1 Call; tell
- 2 Try rebooting
- 3 First, Then, before
- 4 next
- 5 try to

18 Listening script

- 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

Pronunciation – Sentence stress 1

- 18 Some students are not comfortable when they can't hear and understand every word in a sentence, particularly if their first language doesn't have sentence stress. Point out to students that the words they can hear are almost certainly the most important for conveying meaning. Finally, reassure them that they are not expected to reproduce similar stress patterns in their own speech. They will be perfectly comprehensible when speaking with a neutral stress pattern.

- 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.

Speaking

This activity provides free practice of the functional language and vocabulary from this section. You could remind the students of the functional language learnt in Section 2 for rephrasing and encourage them to use it in their dialogues. This activity offers the students the chance to be creative and possibly humorous. You could ask some or all pairs to perform a dialogue for the whole class, or in larger classes, put students in groups and ask pairs to perform their dialogue for their group.



Section four – Language development

Functional English – Expressing purpose

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

Saying things another way

- 2 1 Do you mean that the radar is out of order?
- 2 Let me clarify what I'm trying to say.
- 3 Could you just explain what 'unlawful interference' means?
- 4 So basically, you need to continue with your current heading.
- 5 What do you mean?
- 6 Could you give me an explanation?
- 7 I'm not sure that I understand.
- 8 Can you give me an example?
- 9 In other words, the computer doesn't allow the pilot to fly manually.
- 10 To put it another way, we have a serious problem.

Giving instructions

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

Vocabulary – Communications

- 1 1 speak, message
- 2 send, routine
- 3 voice, understand
- 4 text, words
- 5 communications, congestion
- 6 select, pre-formatted
- 7 deliver
- 8 responses, sequence
- 9 give, repetition
- 10 missed, transmissions

Vocabulary from the unit

- 2 1 help 5 avoid
- 2 have 6 afford
- 3 required 7 allow / permit
- 4 need / have 8 allow / permit
- 3 1 features 7 needed
- 2 Developed 8 simplifies
- 3 relies on 9 allows
- 4 display 10 focus
- 5 utilizes 11 eliminate
- 6 adjusted 12 employ



PHOTOCOPIABLE ACTIVITY

This text is a report of a computer crash which occurred in 2004, affecting the UK air traffic control system. The computer crash mainly affected the south-east of England, around the London area, which is also the most congested part of the system. Although the computer was out of service for less than an hour, the event caused much disruption. It was also bad publicity for NATS, the UK air traffic control service, which is often criticized. Most of this criticism is due to the fact that it is privatized. Many people, both inside and outside the UK, believe that air traffic control should always be a public service.

The first activity is a general comprehension check. Make sure that all students have the correct answers and have understood the report before moving on to the discussion activity. Answers in the discussion activity may vary greatly and some of the questions might generate a lively debate.

Key

- 1 was badly hit
- 2 were also restricted
- 3 was not seriously affected
- 4 were advised
- 5 was operating
- 6 was an isolated event
- 7 was not compromised
- 8 was a similar occurrence



1 Complete the text below with the following phrases and *was* or *were*.

an isolated event	operating
a similar occurrence	advised
badly hit	also restricted
not compromised	not seriously affected

COMPUTER CRASH CAUSES MASSIVE DISRUPTION IN AIR TRAFFIC

A computer crash yesterday morning caused delays for tens of thousands of air passengers. The United Kingdom's air traffic control system (1) _____ by the computer crash, with traffic being worst affected at Heathrow, Gatwick, Manchester and Stansted airports.

Heathrow airport, which usually handles more than a thousand flights per day, reported an average two-hour delay on departing flights. Arrivals at the same airport (2) _____. During the morning, controllers at Gatwick airport were only able to handle around ten outbound flights per hour, whereas normally they deal with 30 to 40. While Manchester airport (3) _____, Stansted airport reported that it was operating at just 60% capacity in the morning. Passengers planning to fly to or from these airports yesterday (4) _____ to contact their airline before leaving home.

The computer system, which crashed just after 6 am, (5) _____ again within an hour. NATS (National Air Traffic Services) declared that there were no further problems once the system returned, and they assured the public that it (6) _____ which would not be repeated. They emphasized that safety (7) _____ at any moment during the breakdown.

Critics of the British air traffic control system blame the privatization of NATS for this latest problem. They point out that this is not the first time that something like this has happened. In the summer of 2000 there (8) _____.

2 Work in pairs. Discuss the following questions.

- 1 What do you think could have caused this computer crash?
- 2 What do you think would have happened if the computer failure had lasted longer?
- 3 Do you agree with the idea that the breakdown might have been a result of the privatization of the UK system?
- 4 What procedures are there in your workplace in the event of computer failure?
- 5 What training do you receive in order to deal with computer failure?
- 6 Do you think there need to be more systems in place to deal with computer failure?

ANIMAL HAZARDS IN AVIATION

Introduction

Airports and runways naturally attract birds and other animals, as they offer wide open spaces with a minimum of buildings around. If animals are not kept away from runways, then the risk that they will interfere with an aircraft on take-off is high, and this can have very serious consequences. Airports typically attempt to make their environment less attractive to animals.

Bird strikes and other runway hazards

In aviation, bird strikes refer to incidents in which aircraft collide with birds. While one might think that bird strikes are unfortunate for the birds who are very unlikely to survive such collisions, they are in fact a serious safety hazard for aircraft and have caused fatal accidents as well as significant damage to airplanes. Quite simply, airplanes travel so fast that birds are unable to see them in time and avoid them. While bird strikes can occur at any time, even while cruising at high altitudes, in the vast majority of cases they occur when airplanes are flying at less than 3,000 ft as this is where most birds are to be found. For large passenger airliners the danger is greatest just after take-off or when coming in to land. The principal danger is that of a bird being sucked into one of the engines (known as **engine ingestion**). This significantly affects the airplane's performance or can even cause it to crash. When it's a case of a **multiple strike** (ingestion of a flock of birds), these risks are more serious still. Often the safest course for a pilot who suspects damage in one of the engines is to shut it down and follow the same procedures as in a case of engine failure. The incident in Section 3 illustrates the normal emergency procedure whereby the pilot, having experienced a multiple strike, shuts down the affected engine and plans to return to the airport.

Airports often emit high frequency sounds to frighten the birds away. Measures such as this can provide short-term solutions, but often the birds return. Constant vigilance is required on the part of airport personnel (those who carry out **runway inspections** in particular) and pilots who are airborne. They can alert controllers whenever they spot flocks of birds that may threaten other aircraft.

Aircraft manufacturers also have an important role to play and they try to minimize the damage that birds might cause to the engines or other parts of the aircraft. The cockpit **windshield**, for example, on a commercial airliner needs to be fully resistant to collisions with even the largest of birds.

While birds are the most significant hazard around runways, they are not the only one, and the reading passage in Section 1 gives an overview of hazards caused by other animals.

Objects or debris on the runway can be just as lethal as animal, aircraft or vehicle intrusions. In 2000, a small piece of titanium debris from a recently departed aircraft (about 50 cm long by 3 cm wide) on a runway at Paris Charles de Gaulle airport caused a tyre burst and engine fire of a departing Concorde, leading to the deaths of 104 people. The lessons of this accident have led to an increased frequency of **runway inspections** at many locations.

Engine failure

There are many demands on **aircraft engines**. First they need to generate a great deal of power to provide sufficient **thrust**, the force that moves an aircraft forward. The engines operate at maximum power during take-off, but even during other phases of flight, such as **cruise**, they operate at high power settings. An engine should not add too much extra weight to an aircraft and should be of such a design and shape that minimizes **drag** (the reacting force caused by the passage of the airplane through the air). Engines also need to support fuel efficiency and be capable of operating effectively at extreme temperatures. Finally, there is increasing pressure on engine designers to minimize damage to the environment.

The most important requirement for an engine is that it should be **reliable**. Engine failure has potentially very serious consequences for a **single-engine** airplane. A lot of the basic training for pilots of such aircraft deals with how to make safe emergency landings in such situations, basically **gliding** the airplane that has lost all power. This becomes much more difficult in mountainous terrain or over water. There are thus certain areas where flying a single-engine aircraft is highly risky and in Europe it is a requirement that a passenger jet be a **twin-engine**.

When one engine fails on a twin-engine airplane, and despite improving levels of engine reliability this does happen on commercial jets, it is usually a fairly routine procedure to **divert** to the nearest airport (a pilot will always have, as part of the flight plan, a list of suitable diversionary airports). The pilot can also sometimes reach the scheduled destination. It all depends on his / her position and fuel situation.

One of the most dangerous times for an engine to fail is during take-off, on a twin-engine aircraft the thrust is unbalanced and the pilot will have to take immediate action to correct this. In some circumstances the pilot may be able to abort take-off (this is authorized if travelling at less than the decision speed, termed **V1**), but if travelling at higher speed than the required (and safest) procedure is to take-off in any case. This was the case with the Concorde accident mentioned above, where the pilots knew they



had a problem before lifting off. Exceptionally, a captain has the authority to go against this and abort take-off, but with the aircraft travelling too fast the consequences may be very serious and it's a decision that will need to be justified afterwards. That's not to say that the recommended decision to continue take-off might not have equally serious or worse consequences.

Failure of one engine on a four-engine airplane, at least while cruising, should not be so threatening. If a pilot is worried about the unbalanced thrust, he / she may take the decision to shut down the corresponding engine on the other wing and fly reasonably safely on two engines.

In an incident in February 2005 on a four-engine Boeing 747, a British Airways captain had to shut down one engine just after take-off from Los Angeles. Rather than deciding to return to the airport, he chose to fly on across the Atlantic on three engines and landed safely in Manchester. The US controllers expressed their surprise at this decision but the pilot had the full backing of British Airways. The incident was the subject of much debate amongst experts.

Animals on board

Dangerous animals would never be allowed to travel in the **cabin** of a passenger jet, though they might be transported in the **hold** or on a special **cargo** flight. International rules on transporting animals by air are strict and the only kind accepted on board are household pets, typically cats and small dogs. Even then the number accepted on any particular flight is limited (advance reservation required), a health certificate has to be produced and a special fee will be

charged. This is sometimes higher than the accompanying passenger's fare. Some airlines refuse to accept any animals at all. While airlines are primarily concerned with safety issues, there are also regulations concerning the welfare of the animal being transported.

Shipping animals in the hold or sending them by cargo is different, but still subject to strict regulation. The animals are much less likely to cause any disruption to the safe operation of the flight, providing they are properly secured. In the incident with the lion having broken out of its cage in Section 2, this was obviously not the case. The welfare of the animals being transported is also a key concern.

Horses are not an uncommon cargo and often an extremely valuable one (when considering the worth of a racehorse or the horses that participate in show jumping). Transporting horses safely and with a minimum of stress (they can be badly affected by this) is a task which requires expertise. They are not generally sedated as this can be harmful. The recommended procedure is that the horse travels with its groom, who can comfort it as necessary during the flight and provide it with the right amounts of food and water. If horses became seriously upset, they could cause a safety risk to the operation of a flight, so horses are never flown on the same airplane as passengers. Pilots and air traffic controllers do sometimes need to adjust their procedures accordingly. Pilots are strongly advised to ascend and descend at a gradual rate (so as not to disturb a horse's balance). Air traffic controllers are advised to ensure as far as possible that delays to any flight with horses aboard be kept to a minimum.

The transportation of horses is a lucrative market with healthy profits to be made by the operators.

for fun

An unusual sighting ...

Controller (to aircraft that just landed): Bear right, next intersection.

Pilot: Roger, we have him in sight.



ANIMALS

Section one - Wildlife on the ground

This section deals with the problem of wildlife around airports. It teaches the vocabulary necessary to describe the kinds of problems that can occur as well as vocabulary related to the security measures taken to control the problems. The section also teaches the language function of expressing necessity.

- 1 Before students open their books, ask them to brainstorm with their partner which animals, apart from birds, can cause problems at an airport. Walk around and help them with any vocabulary that they need. Ask them also to make a brief note of the problem each particular animal might cause.

After students have matched the stories and checked their answers, ask them to discuss the following questions in pairs:

In which of the four stories was there a potential danger for aircraft? (A and D)

What specific measures can you think of to tackle these problems where aircraft are at risk?

(Suggested answers: poison the rabbits / have a system in place to ensure animals on board are properly secured)

After students have completed this activity, write the following vocabulary on the board: *ground crew, unloading, bulkhead, concourse, smugglers, cargo hold, cargo handlers*. Ask students to find and underline these words in the stories. Then ask them to try and deduce their meanings from the contexts, discussing these deductions in pairs. Be ready to explain any words that they don't know or are unsure of. Note that *bulkhead* is a wall separating the sections inside an aircraft.

1 B 2 D 3 C 4 A

- 2 When answering these two questions students may talk about birds and the dangers of bird strikes. This area is dealt with in Section 3, so try to elicit examples involving other animals. Point out that the second question asks about problems at *ground level*.

In groups, ask students to think of two problems involving animals based on real events and invent one problem. When feeding back to the class, the other students have to guess which problem was invented.

For each real problem mentioned, ask about any preventative measures that were put into place.

- 3 Ask students to close their books and discuss the following pre-reading questions:

What kind of wildlife incidents do you think are experienced in US airports and how serious are they?

Can you guess what percentage of wildlife incidents are caused by birds?

Do you think wildlife incidents in the US are increasing in frequency? Why / Why not?

Then let students read the text to see if their predictions were right as well as to find out what the figures given in the activity refer to.

Note the term *go around* in the first paragraph. This is used when a pilot decides it is not safe to land and applies full power to climb again and re-enter the circuit around the airport. Note also that the text confirms that the major threat to safety is caused by birds, as they account for 97% of incidents involving wildlife.

- 2 the weight of a coyote
- 3 people injured from 1990 to 2005 by planes hitting wildlife
- 4 losses caused by this type of incident
- 5 the percentage of this type of incident involving birds



- 4 Sentence 3 is false because incidents actually increased fourfold between 1990 and 2005. You could ask students why they think such a major increase occurred and what they think the implications are. In fact this does not necessarily mean risks are increasing. As the text points out, air traffic increased significantly during this period and pilots are more likely now to report incidents involving wildlife, indicating an improvement in safety.

1 F 2 F 3 F 4 T 5 T

Vocabulary – Security measures

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

Functional English – Expressing necessity

- 1 Ask students to close their books and write the two sentences on the board. After they have found the answers, ask them to explain the difference between the two structures. Then let them read the explanation in the book to see if they were right.

Explain that we can also use *need to* with the pronoun *they*, as in *they need to*, when we are not sure who will improve or fix something.

- 1 needed to go
- 2 need scaring away

- 3
- 1 For information on what the students may say about avoiding bird strikes, you can refer to the introductory teaching notes in this unit. Avoiding birds and animals is an important component of the initial training for both pilots and controllers.
 - 2 When discussing security measures students should make use of the words presented in the vocabulary section. Ask students about the ethical aspects of some of these measures, for example, the use of poison. They may know of some situations where wildlife is protected or where some security measures are not authorized for ethical reasons.



Section two – Animals on the loose

The emphasis in this section shifts towards dangers caused by animals on board. The listening comprehension activity deals with an incident in which a lion breaks loose in the cargo hold. The section teaches the language functions of expressing preferences and explaining unknown words. In the pronunciation activity, the way in which words run together in a sentence is illustrated.

- 1 When students have completed this matching activity, tell them that these pictures are all connected with the incident they will listen to. Ask them to work in pairs to construct a plausible scenario. Encourage them to be imaginative and give them a chance to share their stories with the class.

1 C 2 D 3 E 4 A 5 F 6 B

- 2 Answers to these questions may differ depending on what the students know about the transportation of animals. They might mention horses (see introductory notes to this unit). They may wish to discuss the regulations relating to the transportation of animals. Some supplementary questions you could ask are:

What animals may be transported in the passenger cabin?

What are the regulations on the introduction of animals to the cabin?

What animals can be transported in the hold?

What are the rules governing the transportation of animals in the hold?

For suggested answers, see the introductory notes to this unit.

3 19

- 1 A lion is escaping from a cage in the hold.
- 2 The lion escapes.

19 Listening script

P1 = pilot 1, P2 = pilot 2, G1 / 2 = ground 1 / 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 on to 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!



4 19

- 1 outbound
- 2 aft
- 3 unloading
- 4 push back, 1305
- 5 have a look
- 6 lock, hinge
- 7 a vet

Functional English – Expressing preferences

- 1 After students have completed this activity and checked their answers, provide some explanation of this language function as follows:

- *I want to = I'd like to* (this is more polite)
- *I'd rather = I'd prefer to* (comparative sense – both are used when one course of action is chosen in preference to another)
- Negative forms:
I don't want to
I wouldn't like to
I'd rather not (NOT *I wouldn't rather*)
I'd prefer not to (NOT *I wouldn't prefer to*)

All of these structures, both positive and negative, are followed by a verb in its infinitive form.

Both *I want to* and *I'd like to* often contain a subject before *to*, when you want someone other than yourself to carry out the action, e.g. *I want to cook the dinner now.* / *I want you to cook the dinner now.*

I'd like to test this engine. / *I'd like the maintenance team to test this engine.*

- 1 don't want to
- 2 'd rather
- 3 'd like you to
- 4 don't want anyone to
- 5 'd prefer to

- 2 20 Ask students if they can explain what is happening to the word *to* in this structure and why. (It is unstressed. If you didn't know it was there, you probably wouldn't hear it, but the sentences are perfectly comprehensible without *to*.)

20 Listening script

- 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.

- 3 1 want to work
- 2 prefer not to do
- 3 prefer to be
- 4 want us to clean
- 5 like to cut
- 6 like to give
- 7 prefer people to speak
- 8 wants to do
- 9 like me to repeat
- 10 'd rather work

- 4 When students read the sentences they have written to their partner, encourage them to ask each other questions about the reasons behind their statements.

Ask students to change partners several times and repeat the discussions.

Pronunciation – Word endings

- 21 This activity is known as back chaining. It is a good way to raise awareness of how native speakers of English join words together. Awareness of the way in which words join together should aid the students in their comprehension of natural speech.

21 Listening script

- 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 This is one of the most critical language functions we can teach to pilots and controllers. Communication breakdown can occur if one key word is misunderstood between a pilot and controller. The ability to paraphrase is crucial. Sometimes neither party may be aware of the correct word in English. This is not serious if they can use other words to adequately describe what they want to say.

If necessary, review the structures with the students:

It's made of + material

It's something for + -ing

It's used to + verb

The thing that + verb (third person singular)

This is something that + verb (third person singular)

Model the sentences for students by playing a guessing game. Think of an everyday object and give clues using the structures until the students guess the object. Ask students to repeat with other objects.

a container

- 2 As well as offering useful practice of the functional language, this activity reviews key vocabulary taught in the unit.