

## 1 Prototypes

- Start here** 1 Work in pairs or small groups and brainstorm this question: What applications would a perfect smartphone have?
- Reading** 2 Read the review of a new prototype and answer these questions.
- 1 Which figure illustrates this prototype?
  - 2 How does it work?
  - 3 What technologies does it use?

### New developments in smartphone technology

Virtual reality (VR) was once called the big new idea in ICT, but no commercial applications were discovered during the years of research. VR has now been replaced by a new concept: augmented reality (AR). AR stays in the real (not virtual) world, adding digital value to what people see around them.

AR software has been created which can locate and recognise objects, instantly labelling them with relevant information obtained from the web.

Combining data from a camera, GPS, tilt sensors, digital compass and wireless broadband, it can determine exactly what is being looked at. Once the object has been identified, the internet is searched for relevant information. Once retrieved, the information is displayed as a label superimposed on the image.

When pointed at a mountain, for example, the device adds its name, height and other information to its image. The equipment can also find a nearby friend in a street, or guide you to a destination like a SatNav.

In the past, only static data (e.g. from Wikipedia) was used for the labels. More recently, ways of retrieving live data (such as aircraft departure times) have been developed.

Current research is being carried out into methods of building social networks into the system, so that you can see live information about people when the camera is pointed at them (if their smartphone is also switched on).

The small size of the smartphone screen, however, is still a problem, and more work needs to be done to solve it.

In the future, the main areas of research are likely to give smartphones the ability to find people's locations anywhere in the world and to provide relevant information about everyone you point your camera at.

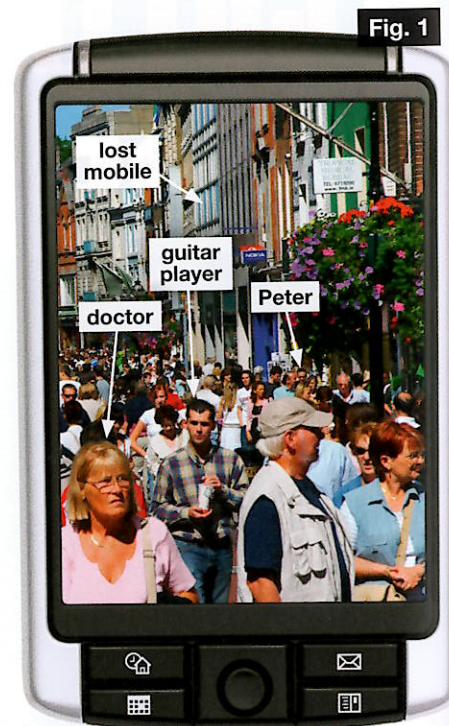


Fig. 1



Fig. 2



**3** Match the items A–I with 1–9, based on the information in the text in 2.

A	aim of system	1	study ways to include data about people from social websites
B	components	2	device works in this way: (1) obtains data from GPS and sensors to locate object (2) retrieves data from internet to identify object (3) finds relevant data from internet to add value to object
C	user operation	3	point camera at object + device displays information as label superimposed on image
D	method	4	test live data in AR prototypes
E	outdated technology	5	solve problem of small display
F	recent development	6	device can locate people anywhere + show information about everyone you meet
G	currently in progress	7	add digital value to the real world
H	action still required	8	find only static data in AR applications
I	future target	9	phone, camera, GPS, tilt sensors, compass, wireless broadband, internet

**Language** **4** What is the most appropriate language form 1–9 to perform the functions in A–I in 3?

1	present continuous + time phrase (e.g. <i>currently</i> )	6	<i>have to / need to</i> + infinitive
2	present perfect + time phrase (e.g. <i>recently</i> )	7	past simple + time phrase (e.g. <i>in the past</i> )
3	<i>the aim / objective</i> + <i>of</i> + noun + <i>is</i> + <i>to</i> + infinitive	8	<i>by</i> + verb -ing
4	<i>will (no doubt) / is (probably) going to</i>	9	present simple
5	<i>consist of</i>		

**Speaking** **5** Describe the AR system in Fig. 1, without looking at the text in 2. Use the table in 3 and the language forms in 4. Use the passive where appropriate.

**6** Work in groups. Discuss the SixthSense prototype illustrated in Fig. 2, using the data in the table below and the language in 4. Take turns to talk about different aspects.

aim	project images and data about an object onto surface of object
components	camera, projector, smartphone (worn round neck); coloured caps on fingers
operation	user points camera at object + makes gestures with coloured finger caps + device projects relevant information onto surface of object
method	finds GPS co-ordinates; obtains data from internet; recognises finger gestures
outdated technology	device provides only static data on small smartphone screen
recent development	researchers find ways to provide live data and projects it <i>outside</i> the smartphone
work in progress	researchers teach device to recognise many more finger gestures (e.g. circle for clock, @ sign to download email)
further work required	reduce size of equipment so it can be worn as glasses
future target	turn the whole world into an interactive screen for the smartphone; increase amount of live data available

**Writing** **7** Work individually. Write a description of the SixthSense prototype following the order of the information in the table in 6 and using the phrases in the left-hand column as headings. Use the passive where appropriate.

Begin:

**Aim**


*Although AR technology is very powerful, a new system is now being developed to overcome the limitations of smartphone screen size. This is the SixthSense smartphone, which aims to project ...*

**Components**

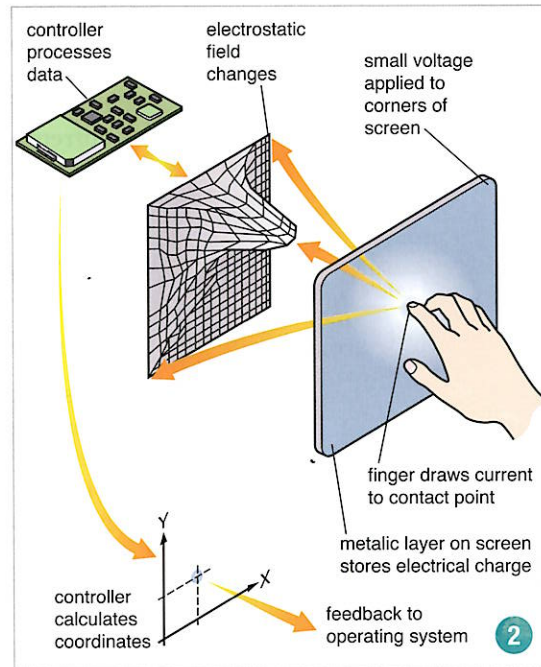
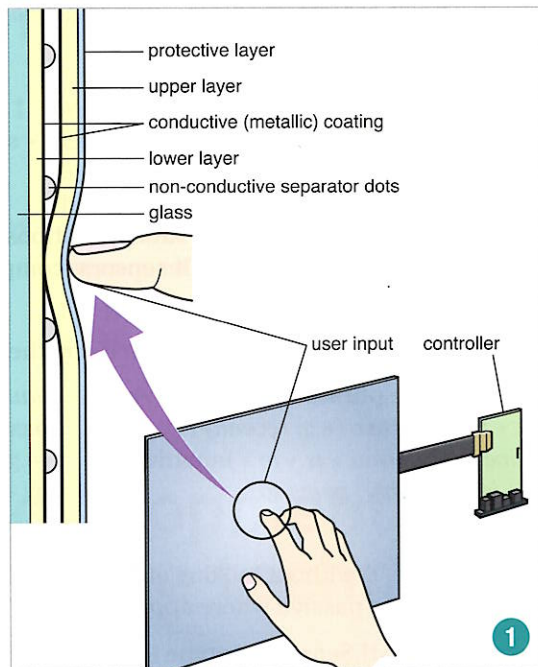
*The system consists of ...*

## 2 Comparisons

Start here

1  19 Listen to a discussion about touch screens and answer these questions.

- 1 What are the names of the two types of touch screen illustrated below?
- 2 How many metallic layers does each touch screen have?



Listening

2 Study the diagrams above and write R (resistive), C (capacitive), B (both) or N (neither) next to each feature below.

- |               |  |   |
|---------------|--|---|
| 1 principle:  | electrical circuit <u>R</u>  | stored electrical charge ____                 |
| 2 action:     | light contact ____   | pressure ____                                 |
| 3 result:     | pushes metallic layers together to close circuit at contact point ____ | pulls current to contact point on screen ____ |
| 4 input by:   | finger only ____   | any object ____                               |
| 5 clarity:    | poor (more light filtered out) ____                                    | less light filtered out ____                  |
| 6 surface:    | good scratch resistance ____   | poor scratch resistance ____                  |
| 7 durability: | wears down less quickly ____   | wears down more quickly ____                  |

3 Listen to the discussion again, and check your answers to 2.

Language

### Comparing and contrasting

- The clarity of the capacitive screen is **much greater than that** (= the clarity) **of** the resistive one.
- **Unlike** the resistive screen, the capacitive one only has one metallic layer.
- With a capacitive screen, **instead of using pressure**, you touch it very lightly.
- You can only use your finger with a capacitive screen, **while / whereas** you can use any object with a resistive screen.
- You could say it's a disadvantage of the capacitive screen. **On the other hand**, you're less likely to scratch the screen surface.
- **Compared with** the capacitive screen, the resistive one can wear out very quickly.

Speaking

4 Work in pairs. Discuss the advantages and disadvantages of the two systems, with one person arguing in favour of the resistive system and the other supporting the capacitive one. Use a variety of language from the box above.



- Task 5** A technical writer is planning to write a report comparing the two touch screen systems in the factsheets below. Look at the information in the factsheets and study the following notes that the writer has made.

### Introduction

Purpose: compare IR and SAW; help company buy best system

### Similarities

Paragraph explaining similarities: 1. good clarity in both systems – because no metallic layers; 2. both systems use signals on or over screen surface

### Differences in technology

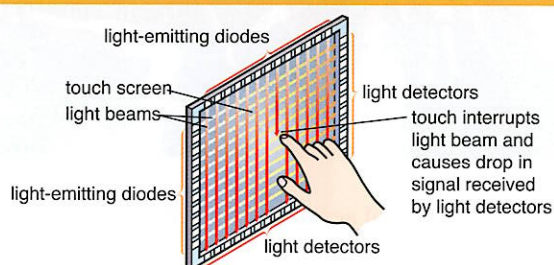
Paragraph about IR: LEDs / light beams / detectors / touch / interrupts beam / drop in signal / controller / determines location of touch

Paragraph about SAW: transducers / sound waves / reflectors / touch / absorbs energy / controller / wave amplitude / location

**Differences in performance resulting from technology**  
(4 short paragraphs comparing IR and SAW for:)

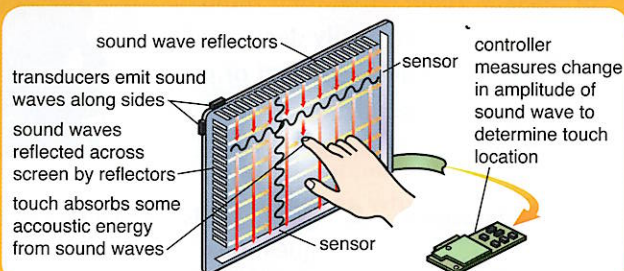
- 1 Input
- 2 Effect of bright light / loud music
- 3 Resistance to moisture and contaminants
- 4 Applications

## INFRARED (IR) TOUCH SCREEN



- No metallic layer over screen, so high clarity
- Technology: light beams slightly above screen surface
- Method: touch interrupts beams
- Responds to any input: finger, pen
- Affected by bright ambient light
- Can be sealed and protected against weather and contaminants
- Applications: outdoors, medical, industrial

## SURFACE ACOUSTIC WAVE (SAW) TOUCH SCREEN



- No metallic overlay: high clarity
- Technology: sound waves on screen surface
- Method: touch absorbs acoustic energy
- Responds to soft objects: finger, soft stylus
- Affected by loud ambient noise
- Cannot be sealed: badly affected by moisture or contaminants
- Applications: indoors, banks, payphones

- Scanning 6** Practise your speed reading. Look for the information you need on the SPEED SEARCH pages (116–117). Try to be first to complete the information below.

- 1 The IR screen has *more* / *less* clarity (i.e. transmits more light) than the SAW.
- 2 The SAW screen operates in a *wider* / *narrower* temperature range than the IR.

- Writing 7** Write a product comparison report based on the information and the notes in 5, comparing the two touch screen systems. Use language from the box on the opposite page where appropriate.

Begin:

### Introduction

The purpose of this brief report is to compare touch screen systems: infrared (IR) and surface acoustic wave (SAW), to assist in the process of selecting the best touch screen system for our company's needs.

### Similarities

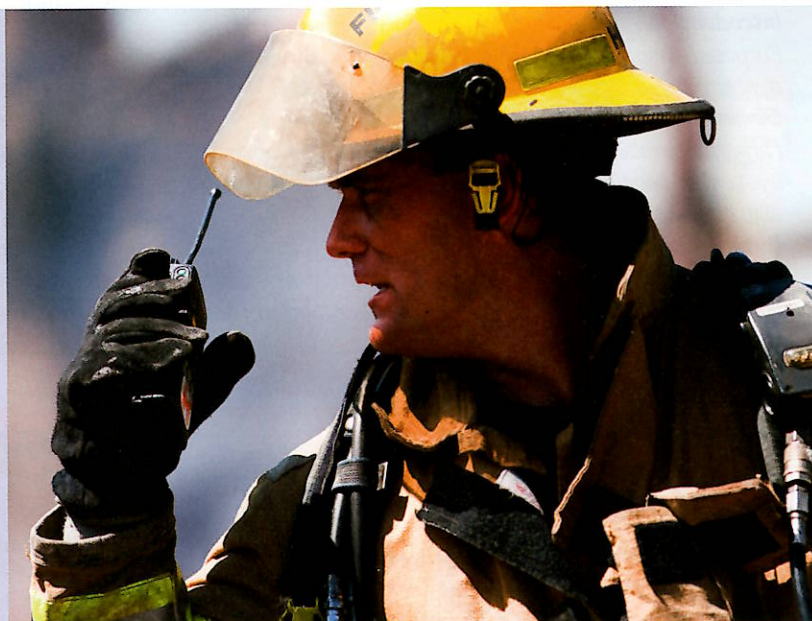
Both touch screen systems have very high clarity because (unlike resistive or capacitive screens) there are no ...




### 3 Products

- Start here** 1 Work in pairs. Discuss this problem and brainstorm some possible solutions. Make a list of the best solutions.

**RADIO AERIALS** are essential equipment for telecommunications of all kinds. And yet, despite their importance, they are very delicate pieces of equipment. They are often made of materials which break easily, such as copper. For many decades, complaints have been received from professionals working in emergency situations – policing, war zones, fire fighting or disaster relief – that their radio aerials have been easily destroyed and that lives have been lost or put in danger as a result.



- Listening** 2  20 Listen to a product launch of a new type of aerial and answer these questions.
- 1 How does the new aerial solve the problem in 1? Compare with your list of solutions in 1.
  - 2 The new aerial is made of an alloy of which two metals?
  - 3 What method is used to tune the new aerial to the correct wavelength?
- 3 Listen again and do the following.
- 1 List five useful properties of the new aerial that are mentioned.
  - 2 List the four forces or stresses that an aerial is normally subjected to.
- 4 Listen again and complete the speaker's words with the words and phrases in the box.

in other words To put this in everyday terms that is Another way of putting this is that  
i.e. To put that in layman's terms or that is to say

- 1 The first is resilience, \_\_\_\_\_, the ability to bend but not break under pressure.
- 2 And the second is a regenerative capability, \_\_\_\_\_, the ability to repair itself.
- 3 The four main forces are ... compression, \_\_\_\_\_ squeezing ...
- 4 ... torsion, \_\_\_\_\_, a twisting force ...
- 5 ... and finally impact, \_\_\_\_\_ striking or hitting.
- 6 \_\_\_\_\_, you can't break it by striking it, pulling it, pressing on it or twisting it.
- 7 \_\_\_\_\_ we have produced an aerial which bends without breaking ...
- 8 \_\_\_\_\_, you change the length of the aerial to match the vibration of the wave that's coming in.

#### Language Words and phrases to signal that you are about to explain something

Explaining single words or short phrases: *or, that is, that is to say, in other words, i.e.*

Explaining longer passages: *another way of putting it is that, to put that another way, to put this in everyday terms / language, to put that in layman's terms / language*



5 Match the technical terms in *italics* with their less specialised explanations a–h.

Note: Explanations in a–h are not necessarily scientifically or technically exact.

- |   |  |
|---|--|
| 1 Aerials use an electrical current that <i>oscillates</i> .                    | a) it melts at room temperature                  |
| 2 The current oscillates at a specific <i>frequency</i> .                       | b) vibrates                                      |
| 3 Aerials send out <i>electromagnetic radiation</i> .                           | c) speed of vibration                            |
| 4 They are made of a <i>conductive material</i> .                               | d) the wave that you're sending out              |
| 5 Our team found an alloy with <i>high fluidity</i> .                           | e) magnetic waves caused by an electric current  |
| 6 The alloy has a <i>low melting point</i> .                                    | f) it can stretch like an elastic band           |
| 7 The aerial has <i>high elasticity</i> .                                       | g) a substance that can carry electrical current |
| 8 The aerial length must match the frequency of the <i>outgoing radiation</i> . | h) it flows easily                               |

6 Make full statements from the table, using a variety of expressions from the language box on page 56.

Example: *1 Aerials use an electrical current that oscillates, that is, vibrates.*

7 Work in pairs. Discuss the differences between the speaker's *technical* description and *everyday* description. What methods does the speaker use to make the meaning clearer to a non-specialist audience?

### Technical

Aerials transmit signals by using an oscillating electrical current in a length of conductive material to generate electromagnetic radiation.

### Everyday

To put that in everyday language, this is what happens. An aerial is basically a rod made of a material, such as copper, which can conduct, or carry, electrical current. The current vibrates at a particular speed, and the vibration sends out magnetic waves, known as radio waves. It's a bit like throwing a stone into a pool of water. The vibration of the stone hitting the water sends out water waves in all directions. Or think of clapping your hands together and sending out sound waves.

#### Language

To explain technical terms or ideas to a non-technical or non-specialist audience, it often helps to make comparisons with:

- parts or functions of the human body: *an aerial that can repair itself, just as human skin does*
- everyday objects: *an aerial is basically a rod made of a material, such as copper; it can be stretched like an elastic band*
- everyday actions and events: *an aerial which bends without breaking, as a palm tree does in a hurricane; it's a bit like throwing a stone into a pool of water; think of clapping your hands together and sending out sound waves*

#### Task

- 8 Work in pairs. Choose two of the following items from this unit, and prepare brief explanations (max 80 words) for a non-technical audience. Use the strategies above. Then explain your items to another pair, without mentioning the name. Can they work out which ones they are?

Augmented Reality (AR), SixthSense, capacitive touch screen, surface acoustic wave touch screen, flexible aerial, capacitor, electrical circuit, electrode

#### Writing

- 9 Choose a concept, principle, technology or piece of equipment which is important in your technical field or industry. Describe and explain the same information in two different texts – one technical and the other non-technical.