

## Will drones soon be delivering packages to your doorstep?

### Level 3 • Advanced

#### 1 Warmer

Would you like packages to be delivered to your house by a drone aircraft?

What problems might this cause?

#### 2 Key words

Fill the gaps in the sentences using these key words from the text.

unmanned  
warehouse

hazard  
terrain

infrastructure  
catastrophic

benchmark  
drone

algorithm  
jam

1. A \_\_\_\_\_ is an aircraft that does not have a pilot but is controlled from the ground.
2. An \_\_\_\_\_ aircraft does not have a pilot.
3. If you \_\_\_\_\_ an electronic signal, you block it by broadcasting another signal on the same wavelength.
4. A \_\_\_\_\_ is a big building where large amounts of goods are stored.
5. A \_\_\_\_\_ is something that could be dangerous or cause damage or accidents.
6. \_\_\_\_\_ is an area of land, usually one that has a particular physical feature.
7. \_\_\_\_\_ is the set of systems within a country that affect how well it operates, such as the transport system or the telecom system.
8. An \_\_\_\_\_ is a set of rules for solving problems or doing calculations, especially rules that a computer uses.
9. A \_\_\_\_\_ is an amount, level or standard that you can use for judging how good or bad other things are.
10. A \_\_\_\_\_ problem causes a lot of damage or makes a lot of people suffer.

#### 3 What do you know?

Decide whether these statements are true (T) or false (F). Then, check your answers in the text.

1. The online retail company Amazon already delivers packages using drones.
2. FAA stands for *Federal Air Authority*.
3. Under new FAA regulations, the maximum weight of a drone will be 100kg.
4. A drone can only carry a kilogram in weight for 15 minutes.
5. To be allowed to fly, a commercial aircraft has to prove a serious failure rate of one per one million hours.
6. UAV stands for *unmanned aerial vehicle*.

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#### Are drones really on the verge of delivering packages to your doorstep?

*Amazon says it is ready to fly deliveries by drone as soon as federal rules allow but experts suggest technological intricacies still need to be ironed out*

**Sam Thielman in New York**  
**21 June, 2015**

- 1 How far away are we from a world where drones deliver packages? If Amazon is to be believed, not far at all. Others are not so sure: technical progress past this point isn't merely a matter of invention; it's a matter of public safety.
- 2 Paul Misener, Amazon's vice-president of global public policy, told a congressional hearing recently that his company would be ready as soon as all the rules were in place – but Misener gave no hints as to what that would look like beyond joking with a congressman that there was a basket of fresh fruit on the way to his doorstep to demonstrate the technology's viability.
- 3 The Federal Aviation Authority (FAA) will finally have regulations governing the commercial use of unmanned aircraft by June 2016. But the technology has a long way to go before then and larger machines aren't airway-legal at all yet – only drones up to 25kg will be covered and the FAA points out in the proposed rules that, if you're going to crowd the skies with radio-controlled flying robots, they had better all be using different radio frequencies that nobody can jam or hijack.
- 4 Professor Sajiv Singh of Carnegie Mellon University Robotics Institute, who runs a "critical cargo delivery" company called NearEarth, said that piloting a state-of-the-art drone was a little more like leaving it a trail of breadcrumbs: go to this altitude, perform this short task, go back home. But even short flights from a mobile landing pad pose serious logistical problems, he said.
- 5 "They're not proposing to deliver from one uninhabited place to another uninhabited place; they're proposing to deliver from a warehouse to where the consumer is, which is likely an urban area or a suburban area," he said. "In those particular cases, there are going to be hazards along the way that the vehicle is going to have to detect. Maybe there will be terrain that the map doesn't know about, unless you've mapped that exact route before. Even then, maybe there's construction equipment that wasn't there but is there now. Maybe GPS signals are blocked or partially blocked, in which case it's going to have an incorrect idea about where it is." All this is surmountable, he said – but it's difficult.
- 6 One major problem is maintaining radio contact with a drone and planning for what happens if that contact breaks. "If you have an off-the-shelf UAV [unmanned aerial vehicle], it'll just keep going and crash into the ground," said roboticist Daniel Huber. That's not a hard problem for an engineer to fix; it's just that the fix isn't yet an industry standard.
- 7 Furthermore, "you can't do everything with a 25kg aircraft", said Jay McConville, director of business development for unmanned systems at defence and business contractor Lockheed Martin MST. Much of the focus at Lockheed Martin has been on making drone piloting interfaces less like elaborate flight simulators. "Those of us in the aircraft business have to remind ourselves that the operator doesn't really care about every little thing about the aircraft and wants instead to focus on the end result," he said. "Operators want to see vehicle status information; they want to see video on their handheld device or their laptop."
- 8 "Technologically, most of the things that are needed for this are in place," said Huber. He is working on a program that proposes using drones to inspect infrastructure – pipelines, telephone lines, bridges and so on. "We've developed an exploration algorithm where you draw a box around an area and it'll autonomously fly around that area and look at every surface and then report back."
- 9 Huber, a senior scientist at Carnegie Mellon's Robotics Institute, where he works on 3D systems imagery, said with respect to a program like Amazon's: "I have heard them say that many packages are lightweight – a drone can carry a kilogram for 15 minutes. If you have a vehicle that can go into a neighbourhood, it can deliver from that base. You need a 15-minute distance and typical off-the-shelf drones have about that distance." It's one way, he said, of making sure the surrounding population is relatively safe. "The larger you get, the more dangerous you get."
- 10 Logistical problems are in the middle of being solved in some very dramatic ways, Huber said. At a recent conference, he said, a disaster relief drone firm, SkyCatch, demonstrated a robot

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that could autonomously take off and, when it got tired, land on its own charging station. "It would land and take off and, when it ran low on batteries, it would land, exchange the batteries and take off again," he said.

- 11 Of course, safety remains a major concern – Singh points out that, for a commercial aircraft to be considered skyworthy, it has to prove a rate of one serious failure every 1m hours. Drones, he said, are "one or two orders of magnitude away" from that benchmark. "The Reaper drone has one failure in 10,000 hours," Singh said. An oil leak, by the way, doesn't count as catastrophic failure – something has to fall out of the sky. "We're closing the gap," Singh said. "There's a lot of interest."

- 12 Part of this is simply that air travel is inherently dangerous and, thus, standards are much higher. "If you fly commercial airlines, often they'll say, 'Oh, a component has failed – we have to go back to the gate,'" Singh said. "And that's an established industry with 60 years of legacy! I shudder to think that one of these things might come down on a crowded highway." Part of the solution, Singh said, is simple contingency planning: "If things fail, the vehicle has to do something reasonable."

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### 4 Comprehension check

Choose the best answer according to the text.

- What happens if radio contact with a UAV is lost?
  - An engineer fixes the problem.
  - The drone keeps going until it crashes.
  - The controller quickly re-establishes contact again.
- How does the Reaper drone compare with commercial aircraft in terms of safety?
  - It is much safer.
  - It is just as safe as commercial aircraft.
  - It is much less safe than commercial aircraft.
- What problems might a drone have delivering from a warehouse to where the consumer is?
  - The consumer's address might be more than 15 minutes away from the mobile landing pad.
  - There might be hazards such as construction equipment or unmapped terrain along the way.
  - The consumer might not be at home when the drone arrives.
- When will Amazon be ready to use drones to deliver packages?
  - when it has solved all the logistical problems
  - when all the rules and regulations have been approved
  - when it has found a way to ensure GPS signals never get blocked

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#### 5 Find the word

Find the following words and phrases in the text.

1. a noun meaning *the ability of something to be done and be worth doing* (para 2)
2. a four-word adjectival phrase meaning *using the newest and most advanced ideas and features* (para 4)
3. an adjective meaning *able to be dealt with successfully* (para 5)
4. a three-word adjectival phrase meaning *sold for general use, not made for a particular person or purpose* (para 6)
5. an adjective meaning *in good condition and safe to fly* (para 11)
6. a three-word noun phrase meaning *a level in a system for measuring things, in which each level is ten times higher than the one before* (para 11)
7. an adverb meaning *by its very nature* (para 12)
8. a two-word noun phrase meaning *preparations for a possible bad event* (para 12)

#### 6 Verb + noun collocations

Match the verbs in the left-hand column with the nouns or noun phrases in the right-hand column.

- |             |                         |
|-------------|-------------------------|
| 1. perform  | a. radio contact        |
| 2. pose     | b. GPS signals          |
| 3. map      | c. a logistical problem |
| 4. maintain | d. packages             |
| 5. deliver  | e. a task               |
| 6. block    | f. a route              |

#### 7 Word-building

Complete the sentences using the correct form of the word in brackets at the end of each sentence.

1. Amazon are not proposing to deliver from one \_\_\_\_\_ place to another. [INHABIT]
2. \_\_\_\_\_, most of the things that are needed for drone delivery are already in place. [TECHNOLOGY]
3. Commercial aircraft have to prove a rate of one serious \_\_\_\_\_ every one million hours. [FAIL]
4. Air travel is \_\_\_\_\_ dangerous. [INHERENT]
5. Drones can inspect infrastructure by flying \_\_\_\_\_ around an object and reporting back. [AUTONOMOUS]
6. Drone flights still pose serious \_\_\_\_\_ problems. [LOGISTICS]

#### 8 Discussion

Discuss the statements.

- Flying is dangerous. I always travel by car these days.
- Amazon's plan to use drones to deliver packages is perfectly viable. I think all companies should start doing it, including the post office.
- I like the fact that I can go into a shop and buy an off-the-shelf UAV. They are great fun!

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#### KEY

#### 2 Key words

1. drone
2. unmanned
3. jam
4. warehouse
5. hazard
6. terrain
7. infrastructure
8. algorithm
9. benchmark
10. catastrophic

#### 3 What do you know?

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

#### 4 Comprehension check

1. b
2. c
3. b
4. b

#### 5 Find the word

1. viability
2. state-of-the-art
3. surmountable
4. off-the-shelf
5. skyworthy
6. order of magnitude
7. inherently
8. contingency planning

#### 6 Verb + noun collocations

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

#### 7 Word-building

1. uninhabited
2. technologically
3. failure
4. inherently
5. autonomously
6. logistical