



## **ANGLAIS**

### **New centimeter-accurate GPS system could transform mobile devices**

5 Researchers in the Cockrell School of Engineering at The University of Texas at Austin have developed a positioning system using GPS which is a centimeter-accurate. That system could revolutionize geo-location on cellphones and other technologies, making global positioning and orientation far more precise than what is currently available on a mobile device.

The researchers' new system could allow unmanned aerial vehicles to deliver packages to a specific spot on a consumer's back porch<sup>1</sup>, enable collision avoidance technologies on cars. The researchers' new centimeter-accurate GPS coupled with a smartphone camera could be used to quickly build a globally referenced 3-D map of one's surroundings.

10 Humphreys and his team in the Radionavigation Lab have built a low-cost system that reduces location errors from the size of a large car to the size of a nickel -- a more than 100 times increase in accuracy.

15 Centimeter-accurate positioning systems are already used in geology, surveying and mapping<sup>2</sup>, but the survey-grade antennas that these systems employ are too large and costly for use in mobile devices. The breakthrough<sup>3</sup> by Humphreys and his team is a powerful and sensitive software-defined GPS receiver that can extract centimeter accuracies from the inexpensive antennas found in mobile devices -- such precise measurements were not previously possible. The researchers anticipate that their software's ability to leverage<sup>4</sup> low-cost antennas will reduce the overall cost of centimeter  
20 accuracy, making it economically feasible for mobile devices.

Humphreys and his team have spent six years building a specialized receiver, called GRID, to extract so-called carrier phase measurements from low-cost antennas. GRID currently operates outside the phone, but it will eventually run on the phone's internal processor. To further develop this technology, Humphreys and his students recently co-founded a  
25 startup, called Radiosense. Humphreys and his team are working with Samsung to develop a snap-on accessory that will tell smartphones and tablets their precise position and orientation.

Further information: <http://gpsworld.com/accuracy-in-the-palm-of-your-hand/>

30 FOOTNOTES:

1. porche, espace couvert en avant de la porte d'entrée d'un édifice  
topographie et cartographie
3. Invention révolutionnaire
4. optimiser

**I. READING COMPREHENSION**

**A.** Read the text and write down the number of the paragraph corresponding to each idea. (2.5 marks)

Ideas	Paragraph n°
1. How accurate the system is	
2. Ways to generalize the invention	
3. Possible applications of the invention	
4. An invention and its purpose	
5. What makes the new positioning system a revolution	

**B.** Complete the following table with information from the text. (1.5 marks)

6. Name of the system	_____
7. Nature of the system	_____
8. Type of device the system works with	_____
9. Function of the system	_____
10. Possible uses of the new system	a. _____
	b. _____
	c. surveying and mapping geographical areas

**C.** Choose **T** (True) or **F** (False) and justify by quoting from the text. (3 marks)

11. Flying vehicles equipped with the new GPS system require a pilot to operate them. ----- T / F

**Justification:** \_\_\_\_\_  
\_\_\_\_\_

12. Because of the high level of precision, the new system is expensive. ----- T / F

**Justification:** \_\_\_\_\_  
\_\_\_\_\_

13. The Humphreys team has found partners to extend the use of the system to other devices. -- T / F

**Justification:** \_\_\_\_\_  
\_\_\_\_\_

**D.** Choose and write down **a, b, c,** or **d** to indicate the correct answer. (1.5 marks)

14. “collision avoidance technologies on cars” (line 7) are

- a. technologies built on cars to help limit accidents
- b. technologies used on cars to protect drivers in accidents
- c. technical systems built on cars to prevent crashes.
- d. technical systems enabling drivers to avoid pedestrians

15. “unmanned aerial vehicles” (line 6)

- a. have no pilots on board
- b. have passengers on board
- c. generally have sensitive antennas on board
- d. can run safely on roads

16. “low-cost antennas” (line 17)
- are no obstacles to applying the GPS system to mobile devices.
  - reduce errors in the size of large cars and mobile devices.
  - make mobile devices and smartphones less expensive.
  - reduce measurement capacities of mobile devices.

**II. LINGUISTIC COMPETENCE**

- E. Reformulate the sentences without changing their meaning. (2 marks)**
17. They did not know the importance of such a technological product. That’s why they did not buy it.  
If -----
18. The researchers have recently designed new options to deliver precise position information.  
New options -----

- F. Use the following words to complete the sentences. (2 marks)**

**HEIGHT / DEPTH / WIDE / AMOUNT**

It has become obvious now that the <sup>19</sup> ----- of the sea can be measured accurately using the new GPS system.

Today, some armies can use a GPS system to estimate the <sup>20</sup> ----- of waste (*déchets*) generated by troops on the ground.

A three-lane (*couloir*) road is <sup>21</sup> ----- enough for drivers to avoid collisions when overtaking (*dépasser*) cars.

At toll gates (*péages*) on highways, a GPS system is able to determine the <sup>22</sup> ----- of long vehicles from the wheels to the top of the roofs.

- G. Complete the sentences with the correct form of the verbs. (2 marks)**
- So far, no researchers <sup>23</sup> ----- (**have ever succeeded / ever succeeded / ever succeed**) in developing such an accurate GPS system.
- At the University of Texas, the Humphreys team first <sup>24</sup> ----- (**has worked / worked / is working**) with large and costly antennas for geo-location, in vain. The use of inexpensive antennas in mobile devices <sup>25</sup> ----- (**were / will be / would have been**) a failure, if the developed software <sup>26</sup> ----- (**was not / had not been / would not be**) powerful and sensitive enough to extract centimeter accuracies.

- H. Complete the passage with the appropriate prepositions. (1.5 marks)**

**IN – WHERE – TO – BY – OF – AHEAD**

The researchers believe their technology could make a significant difference <sup>27</sup> ----- people's daily lives, including transportation, <sup>28</sup> ----- centimeter-accurate GPS could lead <sup>29</sup> ----- better vehicle communication technology.

"If your car knows in real time the precise velocity <sup>30</sup> ----- an approaching car that is blocked from view <sup>31</sup> ----- other vehicles, it can plan <sup>32</sup> ----- to avoid a collision," Humphreys said.

**III. WRITING**

- 33. Choose one topic and write a passenger of not more than 150 words. (4 marks)**
- TOPIC 1:** GPS systems are very popular these days. Can you see any advantages and/or drawbacks to use them in smartphones and vehicles?

**TOPIC 2:**

There are too many accidents in our countries. Should public authorities resort to technological systems to reduce car accidents, opt for training drivers or simply implement both options? Give your point of view.