**Expert pre-assessment questionnaire for non-contact map interaction systems**

Dear Participant:

Hello, we are developing a non-contact map operating system and your feedback is very important to us. The purpose of this questionnaire is to find out your preferences for various non-contact operating methods, where non-contact means that common map operating functions are performed without the use of your hands, but rather by eye, voice, head, or facial information. Please take a few minutes to complete this questionnaire to help us improve our products, and we promise to keep your personal information completely confidential. Thank you very much!

一、Basic Information

1. Your age group: [Single choice]

○Under 18 ○18~21 ○22~45 ○46~60 ○Above 60

2. Your gender: [Single choice]

○Male ○Female

3. Have you had any experience with electronic maps? [Single choice]

○Yes ○No

4. Have you had any experience in geographic information development? [Single choice]

○Yes ○No

5. Do you have any experience with non-contact human-computer interaction? [Single choice]

○Yes ○No

二、Map operation and control mode preferences

For each of the following map features, please select the implementation you are most interested in, with multiple choices for each option. If not, you can specify it by selecting "Other". The general design of the system is shown below：

**Map zoom-in**

6. Eye tracking control [multiple choice]

□The left eye open, the right eye closed.

□The left eye closed, the right eye open.

□The left eye blinks on the "Zoom-in" button.

□The right eye blinks on the "Zoom-in" button.

□Both eyes blink on the "Zoom-in" button.

□Others \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

□Not recommended

7. Voice control [multiple choice]

□Say "Map zoom-in".

□Others \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

□Not recommended

8. Head movement control [multiple choice]

□Nod up and down

□Move left and right

□Others \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

□Not recommended

9. Expression control [multiple choice]

□Recognize "smile" expressions

□Others \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

□Not recommended

10. Please rank the different types of realizations given to you above according to your preference, the higher the ranking, the stronger the preference. [For ranking questions, please put the numbers in brackets]

[ ]Eye tracking control

[ ]Voice control

[ ]Head movement control

[ ]Expression control

**Map zoom-out**

11. Eye tracking control [multiple choice]

□The left eye open, the right eye closed.

□The left eye closed, the right eye open.

□The left eye blinks on the "Zoom-out" button.

□The right eye blinks on the "Zoom-out" button.

□Both eyes blink on the "Zoom-out" button.

□Others \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

□Not recommended

12. Voice control [multiple choice]

□Say " Map zoom-out".

□Others \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

□Not recommended

13. Head movement control [multiple choice]

□Nod up and down

□Move left and right

□Others \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

□Not recommended

14. Expression control [multiple choice]

□Recognize "smile" expressions

□Others \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

□Not recommended

15. Please rank the different types of realizations given to you above according to your preference, the higher the ranking, the stronger the preference. [For ranking questions, please put the numbers in brackets]

[ ]Eye tracking control

[ ]Voice control

[ ]Head movement control

[ ]Expression control

**Map pan**

16. Eye tracking control [multiple choice]

□Gazing at a target with the left eye automatically sets the location as the center of the map display.

□Gazing at a target with the right eye automatically sets the location as the center of the map display.

□Gazing at a target with both eyes automatically sets the location as the center of the map display.

□The left eye blinks on the map compass "up/down/left/right" button.

□The Right eye blinks on the map compass "up/down/left/right" button.

□Double eyes blink on the map compass "up/down/left/right" button.

□Others \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

□Not recommended

17. Voice control [multiple choice]

□Say "move up/down/left/right".

□Others \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

□Not recommended

18. Head movement control [multiple choice]

□Nod up and down

□Move left and right

□Others \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

□Not recommended

19. Expression control [multiple choice]

□Recognize "smile" expressions

□Others \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

□Not recommended

20. Please rank the different types of realizations given to you above according to your preference, the higher the ranking, the stronger the preference. [For ranking questions, please put the numbers in brackets]

[ ]Eye tracking control

[ ]Voice control

[ ]Head movement control

[ ]Expression control

**Map toggle**

21. Eye tracking control [multiple choice]

□The left eye blinks on the "satellite" button to toggle.

□The right eye blinks on the "satellite" button to toggle.

□Double eyes blink on the "satellite" button to toggle.

□Others \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

□Not recommended

22. Voice control [multiple choice]

□Say "map toggle".

□Others \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

□Not recommended

23. Head movement control [multiple choice]

□Nod up and down

□Move left and right

□Others \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

□Not recommended

24. Expression control [multiple choice]

□Recognize "smile" expressions

□Others \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

□Not recommended

25. Please rank the different types of realizations given to you above according to your preference, the higher the ranking, the stronger the preference. [For ranking questions, please put the numbers in brackets]

[ ]Eye tracking control

[ ]Voice control

[ ]Head movement control

[ ]Expression control

**Location search**

26. Eye tracking control [multiple choice]

□After the left eye blinks on the text box to bring up the virtual keyboard, both eyes blink on the letters of the virtual keyboard to realize the pinyin text blink input.

□After the right eye blinks on the text box to bring up the virtual keyboard, both eyes blink on the letters of the virtual keyboard to realize the pinyin text blink input.

□After blinking both eyes on the text box to bring up the virtual keyboard, blinking both eyes on the letters of the virtual keyboard to realize the phonetic character blinking input.

□Others \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

□Not recommended

27. Voice control [multiple choice]

□Say "search" & the name of the location you are looking for.

□Others \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

□Not recommended

28. Please rank the different types of realizations given to you above according to your preference, the higher the ranking, the stronger the preference. [For ranking questions, please put the numbers in brackets]

[ ]Eye tracking control

[ ]Voice control

**Route Planning - Interface open**

29. Eye tracking control [multiple choice]

□The left eye blinks on the "Route" button.

□The right eye blinks on the "Route" button.

□Double eyes blink the "Route" button.

□Others \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

□Not recommended

30. Voice control [multiple choice]

□Say "Route"

□Others \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

□Not recommended

31. Head movement control [multiple choice]

□Nod up and down

□Move left and right

□Others \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

□Not recommended

32. Expression control [multiple choice]

□Recognize "smile" expressions

□Others \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

□Not recommended

33. Please rank the different types of realizations given to you above according to your preference, the higher the ranking, the stronger the preference. [For ranking questions, please put the numbers in brackets]

[ ]Eye tracking control

[ ]Voice control

[ ]Head movement control

[ ]Expression control

**Route planning - Location entry**

34. Eye tracking control [multiple choice]

□The Left eye gazes at the target location, after the function menu pops up, double eyes blink to set the start point or end point.

□The Right eye gazes at the target location, after the function menu pops up, double eyes blink to set the start point or end point.

□Double eyes gaze at the target location, after the function menu pops up, double eyes blink to set the start point or end point.

□After the left eye blinks on the text box to bring up the virtual keyboard, both eyes blink on the letters of the virtual keyboard to realize the pinyin text blink input.

□After the right eye blinks on the text box to bring up the virtual keyboard, both eyes blink on the letters of the virtual keyboard to realize the pinyin text blink input.

□After blinking both eyes on the text box to bring up the virtual keyboard, blinking both eyes on the letters of the virtual keyboard to realize the phonetic character blinking input.

□Others \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

□Not recommended

35. Voice control [multiple choice]

□Say "start" & start point or "end" & end point.

□Others \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

□Not recommended

36. Please rank the different types of realizations given to you above according to your preference, the higher the ranking, the stronger the preference. [For ranking questions, please put the numbers in brackets]

[ ]Eye tracking control

[ ]Voice control

**Route Planning - Navigation method selection**

37. Eye tracking control [multiple choice]

□The left eye blinks on the "drive"/"bus"/"walk" button.

□The right eye blinks on "drive"/"bus"/"walk" button.

□The Double eyes blink on the "drive"/"bus"/"walk" button.

□Others \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

□Not recommended

38. Voice control [multiple choice]

□Say the corresponding mode of navigation, e.g. "drive"/"bus"/"walk".

□Others \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

□Not recommended

39. Please rank the different types of realizations given to you above according to your preference, the higher the ranking, the stronger the preference. [For ranking questions, please put the numbers in brackets]

[ ]Eye tracking control

[ ]Voice control

40. What other features do you feel are necessary or would you like to see added to a non-contact map operating system? [Fill in the blank]

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_