User Experiment Questionnaire

# Part 1 - General Information

## Personal information

Occupation: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Age:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 🞎 18-22 | 🞎 23-30 | 🞎 31-40 | 🞎 41-50 | 🞎 51 and over | 🞎 I prefer not to say |

Completed education level:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 🞎 High school | 🞎 Bachelor | 🞎 Master | 🞎 Doctoral | 🞎 Other:  \_\_\_\_\_\_\_\_\_\_\_\_ | 🞎 I prefer not to say |

Major: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

## Experiences and behavior about fire emergency response

[Occupant]

The number of fire drills you participated in:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 🞎 0 | 🞎 1 | 🞎 2 | 🞎 3-5 | 🞎 6-8 | 🞎 9 and over |

[Occupant]

The number of fire emergency response you experienced (including false alarm):

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 🞎 0 | 🞎 1 | 🞎 2 | 🞎 3-5 | 🞎 6-8 | 🞎 9 and over |

[Facility manager/Firefighter]

Years of fire emergency-related work experience:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 🞎 less than 3 | 🞎 3-5 | 🞎 6-10 | 🞎 11-15 | 🞎 16-20 | 🞎 more than 20 |

[Facility manager/Firefighter]

Years of **on-site** fire emergency response-related work experience:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 🞎 less than 3 | 🞎 3-5 | 🞎 6-10 | 🞎 11-15 | 🞎 16-20 | 🞎 more than 20 |

[Occupant/ Facility manager]

Have you experienced any real fire emergencies?

|  |  |
| --- | --- |
| 🞎 Yes, Number: \_\_\_\_\_\_\_\_\_\_ | 🞎 No |

Please rate the following information source(s) to indicate your reliance level on them when finding a path towards your destination (e.g., exit, refuge area, or system control room) during fire emergency responses.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Not reliant at all | | | Extremely reliant | | |
| a. Your personal knowledge about the building | 🞎 | 🞎 | 🞎 | | 🞎 | 🞎 |
| b. The instructive materials like exit signs, door signs, and evacuation plans | 🞎 | 🞎 | 🞎 | | 🞎 | 🞎 |
| c. Other people’s actions or guidance | 🞎 | 🞎 | 🞎 | | 🞎 | 🞎 |
| d. Others: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | 🞎 | 🞎 | 🞎 | | 🞎 | 🞎 |

Please rate the following information source(s) to indicate your reliance level on them when figuring out the accessibility of the route you planned to use during fire emergency responses.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Not reliant at all | | | Extremely reliant | | |
| a. Your actual perception and action | 🞎 | 🞎 | 🞎 | | 🞎 | 🞎 |
| b. Communication with other people | 🞎 | 🞎 | 🞎 | | 🞎 | 🞎 |
| c. Others: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | 🞎 | 🞎 | 🞎 | | 🞎 | 🞎 |

## Experiences with computing applications

How many times have you experienced Virtual Reality (VR) applications before?

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 🞎 0 | 🞎 1 | 🞎 2 | 🞎 3-5 | 🞎 6-8 | 🞎 9 and over |

[Facility manager/Firefighter]

Please estimate your total time period and average hours per week that you spend using computing systems and software applications for emergency response-related activities if there is any:

Total time period: Year(s) Month(s)

Hours per week: Hour(s)

Please specify the system/applications: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

***-------- This is the end of Part 1 --------***

[For researcher’s use only]

|  |  |
| --- | --- |
| Role: Occupant/Firefighter | Group: Group A/Group B/Group C |
| Identifier: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| Researcher: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |  |

Comments:

# Part 2.1 – Experiment Behavior Evaluation (Scenario 1)

Did you ever get lost when conducting the response task during the experiment?

|  |  |
| --- | --- |
| 🞎 Yes (Go to the next question) | 🞎 No (Skip the next question) |

What is the main reason that causes you lost your way during the response task? ***[Please select all that apply]***

🞎 Because of the unfamiliarity with the VR operation and experience

🞎 Because of the unfamiliarity with the indoor building layout

🞎 Because of irrationality and panic

🞎 Others: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Please rate the following information source(s) to indicate your reliance level on them when finding a path towards your destination (e.g., exit or refuge area) during the experiment.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Not reliant at all | | | Extremely reliant | | |
| a. Your personal knowledge about the virtual building | 🞎 | 🞎 | 🞎 | | 🞎 | 🞎 |
| b. The instructive materials like exit signs, door signs, and evacuation plans | 🞎 | 🞎 | 🞎 | | 🞎 | 🞎 |
| c. Other virtual neighbors’ actions | 🞎 | 🞎 | 🞎 | | 🞎 | 🞎 |
| d.\* The support provided by the CORE system | 🞎 | 🞎 | 🞎 | | 🞎 | 🞎 |
| e. Others: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | 🞎 | 🞎 | 🞎 | | 🞎 | 🞎 |

Note: Options with \* are applicable only for cases that allow participants to use the CORE system.

Please rate the following information source(s) to indicate your reliance level on them when figuring out the accessibility of the route you planned to use during the experiment.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Not reliant at all | | | Extremely reliant | | |
| a. Your actual perception and actions | 🞎 | 🞎 | 🞎 | | 🞎 | 🞎 |
| b. Communication with other virtual characters | 🞎 | 🞎 | 🞎 | | 🞎 | 🞎 |
| c.\* The support provided by the CORE system | 🞎 | 🞎 | 🞎 | | 🞎 | 🞎 |
| d. Others: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | 🞎 | 🞎 | 🞎 | | 🞎 | 🞎 |

Note: Options with \* are applicable only for cases that allow participants to use the CORE system.

Overall, is there any difference exists between the experiment and your real response experience when you make decisions or performs the response tasks?

|  |  |
| --- | --- |
| 🞎 Yes, please specify: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | 🞎 No |

***-------- This is the end of Part 2.1 --------***

# Part 2.2 – Experiment Behavior Evaluation (Scenario 2)

Did you ever get lost when conducting the response task during the experiment?

|  |  |
| --- | --- |
| 🞎 Yes (Go to the next question) | 🞎 No (Skip the next question) |

What is the main reason that causes you lost your way during the response task? ***[Please select all that apply]***

🞎 Because of the unfamiliarity with the VR operation and experience

🞎 Because of the unfamiliarity with the indoor building layout

🞎 Because of irrationality and panic

🞎 Others: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Please rate the following information source(s) to indicate your reliance level on them when finding a path towards your destination (*Occupant: exits or your room; Firefighter: the location of the fire hose reel and the trapped occupant*) during the experiment.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Not reliant at all | | | Extremely reliant | | |
| a. Your personal knowledge about the virtual building | 🞎 | 🞎 | 🞎 | | 🞎 | 🞎 |
| b. The instructive materials like exit signs, door signs, and evacuation plans | 🞎 | 🞎 | 🞎 | | 🞎 | 🞎 |
| c.\* The support provided by the CORE system | 🞎 | 🞎 | 🞎 | | 🞎 | 🞎 |
| d. Others: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | 🞎 | 🞎 | 🞎 | | 🞎 | 🞎 |

Note: Options with \* are applicable only for cases that allow participants to use the CORE system installed in the mobile device.

Please rate the following information source(s) to indicate your reliance level on them when figuring out the accessibility of the route you planned to use during the experiment.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Not reliant at all | | | Extremely reliant | | |
| a. Your actual perception and actions | 🞎 | 🞎 | 🞎 | | 🞎 | 🞎 |
| b.\* The support provided by the CORE system | 🞎 | 🞎 | 🞎 | | 🞎 | 🞎 |
| c. Others: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | 🞎 | 🞎 | 🞎 | | 🞎 | 🞎 |

Note: Options with \* are applicable only for cases that allow participants to use the CORE system installed in the mobile device.

Overall, is there any difference exists between the experiment and your real response experience when you make decisions or performs the response tasks?

|  |  |
| --- | --- |
| 🞎 Yes, please specify: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | 🞎 No |

***-------- This is the end of Part 2.2 --------***

# Part 3 - VR Environment Evaluation

## Presence

Please tick in the box to show your feelings about the VR environment used in the experiment.

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| How natural was the mechanism which controlled movement through the environment? | Unnatural | | | Neutral | | | | Natural | | | |
| 🞎 | 🞎 | 🞎 | | | 🞎 | 🞎 | | | 🞎 | 🞎 |
| How much did your experiences in the virtual environment seem consistent with your real-world experiences? | Inconsistent | | | Neutral | | | | Consistent | | | |
| 🞎 | 🞎 | 🞎 | | | 🞎 | 🞎 | | | 🞎 | 🞎 |
| How well could you concentrate on the assigned tasks or required activities rather than on the mechanisms used to perform those tasks or activities? | Distracting | | | Neutral | | | | Concentrating | | | |
| 🞎 | 🞎 | 🞎 | | | 🞎 | 🞎 | | | 🞎 | 🞎 |
| How compelling was your sense of moving around inside the virtual environment? | Uncompelling | | | Neutral | | | | Compelling | | | |
| 🞎 | 🞎 | 🞎 | | | 🞎 | 🞎 | | | 🞎 | 🞎 |
| How natural did your interactions with the environment seem? | Unnatural | | | Neutral | | | | Natural | | | |
| 🞎 | 🞎 | 🞎 | | | 🞎 | 🞎 | | | 🞎 | 🞎 |
| How much did the control devices interfere with the performance of assigned tasks or with other activities? | Not at all | | | | Neutral | | | | Very much | | |
| 🞎 | 🞎 | 🞎 | | | 🞎 | 🞎 | | | 🞎 | 🞎 |
| How completely were you able to actively survey or search the environment using vision? | Incomplete | | | Neutral | | | | Complete | | | |
| 🞎 | 🞎 | 🞎 | | | 🞎 | 🞎 | | | 🞎 | 🞎 |

## Validity

Please tick in the box to show your agreements about your experience in the VR environment.

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| The materials for planning the destination and route (e.g., exit signs and evacuation plans) presented in the VR environment are pretty much the same as I usually experience in the reality. | Disagree | | | Neutral | | | Agree | | |
| 🞎 | 🞎 | 🞎 | | 🞎 | 🞎 | | 🞎 | 🞎 |
| The actions I performed and the decision I made in the VR environment seem consistent with my real-world experiences. | Disagree | | | Neutral | | | Agree | | |
| 🞎 | 🞎 | 🞎 | | 🞎 | 🞎 | | 🞎 | 🞎 |
| The virtual environment (including the building, equipment, virtual characters, and fires) seems unrealistic to me. | Disagree | | | Neutral | | | Agree | | |
| 🞎 | 🞎 | 🞎 | | 🞎 | 🞎 | | 🞎 | 🞎 |
| I feel like I was responding to a serious fire emergency. | Disagree | | | Neutral | | | Agree | | |
| 🞎 | 🞎 | 🞎 | | 🞎 | 🞎 | | 🞎 | 🞎 |
| As I did not need to physically go upstairs/downstairs in the VR environment, it affects me when I determine my destination and my route. | Disagree | | | Neutral | | | Agree | | |
| 🞎 | 🞎 | 🞎 | | 🞎 | 🞎 | | 🞎 | 🞎 |

***-------- This is the end of Part 3 --------***

# Part 4 – System Usability Evaluation

## Usability

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Please tick in the box to show your agreements on the following aspects. | Disagree | | | Neutral | | | Agree | | |
| Using the CORE system enables me to respond to fire emergency (e.g. evacuation, seeking refuge, update or perceive fires, rescue, or find equipment to suppress fires) more quickly. | 🞎 | 🞎 | 🞎 | | 🞎 | 🞎 | | 🞎 | 🞎 |
| I feel comfortable using the CORE system during fire emergencies. | 🞎 | 🞎 | 🞎 | | 🞎 | 🞎 | | 🞎 | 🞎 |
| Learning to operate the CORE system would be difficult for me. | 🞎 | 🞎 | 🞎 | | 🞎 | 🞎 | | 🞎 | 🞎 |
| I am dissatisfied with the CORE system. | 🞎 | 🞎 | 🞎 | | 🞎 | 🞎 | | 🞎 | 🞎 |
| I can flexibly use the CORE system. | 🞎 | 🞎 | 🞎 | | 🞎 | 🞎 | | 🞎 | 🞎 |
| I would find the CORE system useless in responding to fire emergencies. | 🞎 | 🞎 | 🞎 | | 🞎 | 🞎 | | 🞎 | 🞎 |
| I quickly became skillful at using the CORE system. | 🞎 | 🞎 | 🞎 | | 🞎 | 🞎 | | 🞎 | 🞎 |
| I feel I need to have the CORE system when responding to fire emergences. | 🞎 | 🞎 | 🞎 | | 🞎 | 🞎 | | 🞎 | 🞎 |
| I would find the CORE system difficult to use to support my response to fire emergencies. | 🞎 | 🞎 | 🞎 | | 🞎 | 🞎 | | 🞎 | 🞎 |
| Using the CORE system would improve my response performance during fire emergencies. | 🞎 | 🞎 | 🞎 | | 🞎 | 🞎 | | 🞎 | 🞎 |

## Subitem Satisfaction

Please tick in the box to show your agreements on the following aspects.

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Overall, I am satisfied with the […] provided in the CORE system. | Disagree | | | Neutral | | | Agree | | |
| a. Route planning function | 🞎 | 🞎 | 🞎 | | 🞎 | 🞎 | | 🞎 | 🞎 |
| b. Position tracking function | 🞎 | 🞎 | 🞎 | | 🞎 | 🞎 | | 🞎 | 🞎 |
| c. Information provision function | 🞎 | 🞎 | 🞎 | | 🞎 | 🞎 | | 🞎 | 🞎 |
| d. Information sharing function | 🞎 | 🞎 | 🞎 | | 🞎 | 🞎 | | 🞎 | 🞎 |

## Indoor positioning accuracy

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Dissatisfied | | | Neutral | | | | Satisfied | | |
| Please show your satisfaction level on the indoor positioning accuracy: | 🞎 | 🞎 | 🞎 | | 🞎 | | 🞎 | | 🞎 | 🞎 |
| Does the positioning error cause any misleading result and make you do a wrong judgement? | 🞎 Yes | | | | | 🞎 No | | | | |

***-------- This is the end of Part 4 --------***

# Part 5 - Collaboration Performance Evaluation

Based on your real response practice, please determine whether the CORE system can have a positive/same/negative influence on the following aspects to support the collaboration for fire emergency preparedness and response actions.

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Negative | | | No influence | | | Positive | | |
| Situational Awareness |  | | | | | | | | |
| Understand the situation of involved participants (e.g., the location and status of participants) | 🞎 | 🞎 | 🞎 | | 🞎 | 🞎 | | 🞎 | 🞎 |
| Understand the situation of the environment (e.g., the place for temporary refuge or flammable storage) | 🞎 | 🞎 | 🞎 | | 🞎 | 🞎 | | 🞎 | 🞎 |
| Understand the situation of the emergency (e.g., the location and trend of fire) | 🞎 | 🞎 | 🞎 | | 🞎 | 🞎 | | 🞎 | 🞎 |
| Communication |  | | | | | | | | |
| Facilitate mutual communication between different parties | 🞎 | 🞎 | 🞎 | | 🞎 | 🞎 | | 🞎 | 🞎 |
| Information/Resource |  | | | | | | | | |
| Collect and provide desired information/resources | 🞎 | 🞎 | 🞎 | | 🞎 | 🞎 | | 🞎 | 🞎 |
| Manipulate information/resources (e.g., data integration, filtering, matching, and presentation) | 🞎 | 🞎 | 🞎 | | 🞎 | 🞎 | | 🞎 | 🞎 |
| Update and share information/resources | 🞎 | 🞎 | 🞎 | | 🞎 | 🞎 | | 🞎 | 🞎 |
| Collaboration |  | | | | | | | | |
| Collaborate with other involved parties | 🞎 | 🞎 | 🞎 | | 🞎 | 🞎 | | 🞎 | 🞎 |

***-------- This is the end of the questionnaire. Thank you for your participation--------***

Open-ended questions:

1. What would be potential challenges/problems the user could encounter when they use the prototype system in O&M and emergency situations?

2. What did you like the most about the proposed approach and the prototype system?

3. What did you NOT like the most about the proposed approach and the prototype system?

4. What are your overall impressions about the study and its outputs?

5. What are your suggestions for further improvement?