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Orientation in Underground Facilities: results from the SAVE ME testing activity

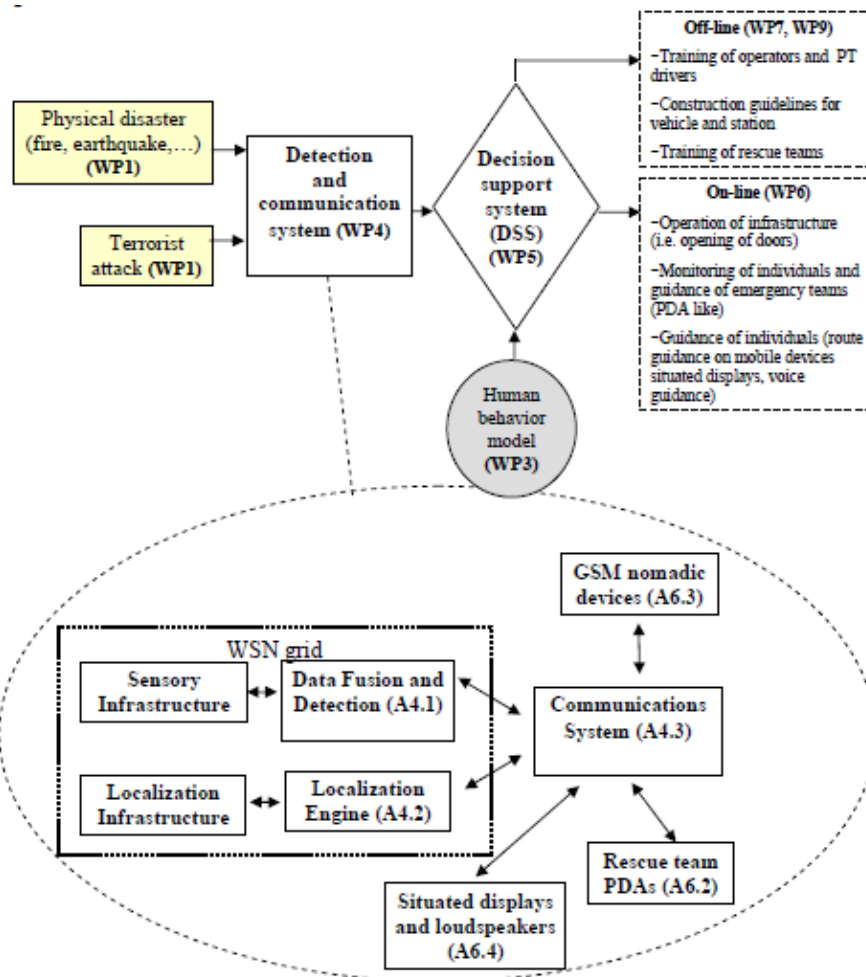


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The SAVE ME Project – in a nutshell

- Co-funded by the European Commission under the 7 th Framework Programme (7FP)
- Started October 2009 Ends in September 2012
- 11 partners from 7 different EU countries
- The main Objective is to develop an integrated system which is able to:
 - Detect natural and human-provoked disasters in critical transport facilities – especially tunnels and underground stations
 - Support rescuers' operations on the location of disaster
 - **Support travellers' self-rescue**

The SAVE ME Architecture and Test Sites



Newcastle Underground (UK)

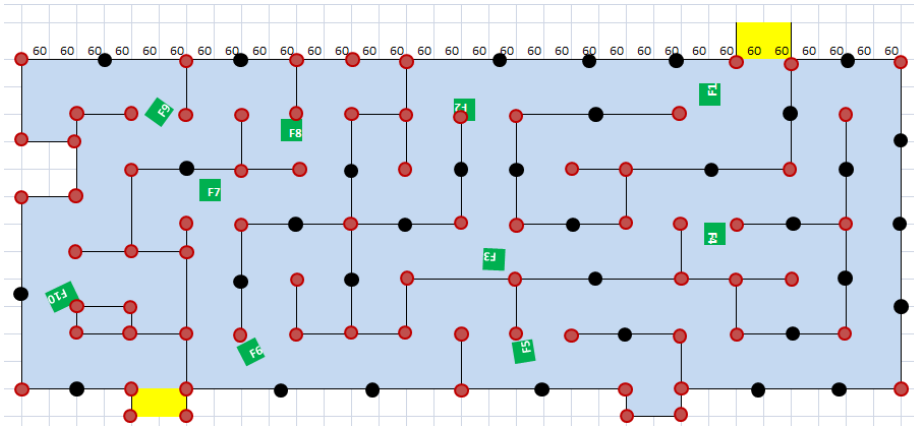


Gotthard Tunnel (CH)

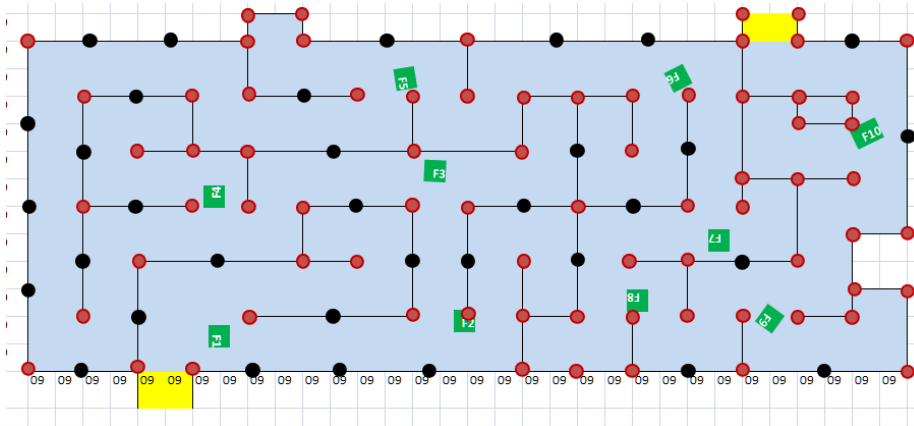
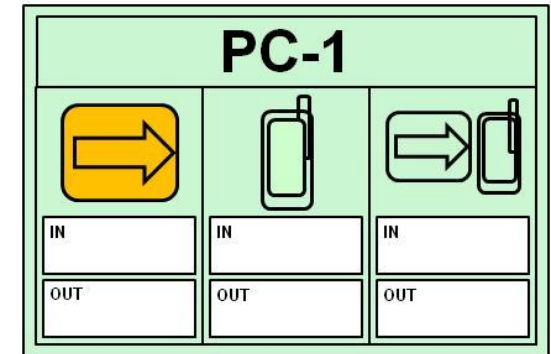
Testing self-rescue behaviour: an experiment

- **Scope:**
 - Observe how people behave in a simulated evacuation task, while being supported by different types of guidance
- **Methodology**
 - **Three labyrinths were built, representing unknown facilities to escape from**
- **Participants:**
 - **44** (12 early teenagers, 12 adults, 12 parents with child, 3 groups, 5 grandparents with child)
- **Procedure:**
 - Participants were asked to find the labyrinth's exit while following the collective herding guidance (Labyrinth 1), the personalized guidance (Labyrinth 2) or both (Labyrinth 3)
 - Participants' were observed through top-down IR cameras
 - Questionnaires were administered after each labyrinth, aiming at assessing participants' perceived workload and impressions

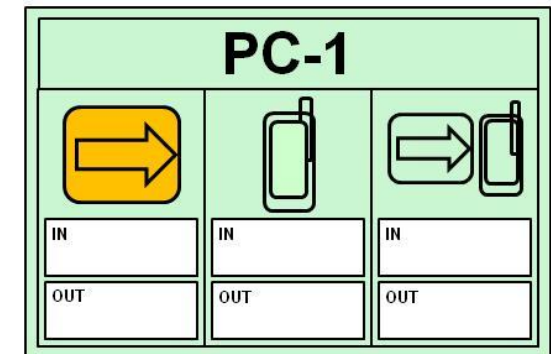
Labyrinths L1-L2



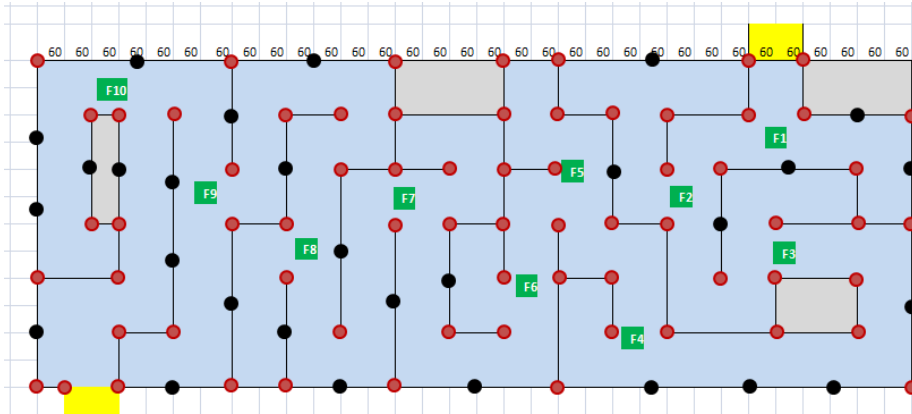
| Fork | Correct Turn |
|------|--------------|
| F1 | R |
| F2 | L |
| F3 | L |
| F4 | L |
| F5 | R |
| F6 | L |
| F7 | R |
| F8 | L |
| F9 | L |
| F10 | R |



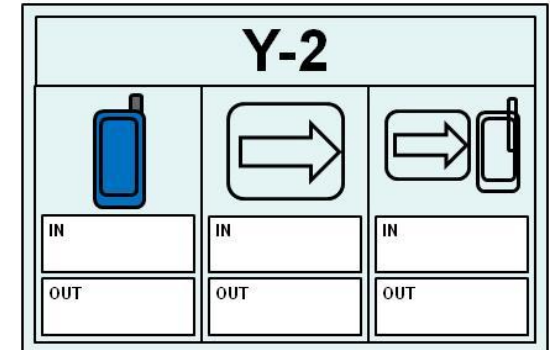
| Fork | Correct Turn |
|------|--------------|
| F1 | L |
| F2 | R |
| F3 | R |
| F4 | R |
| F5 | L |
| F6 | R |
| F7 | L |
| F8 | R |
| F9 | R |
| F10 | L |



Labyrinth L3



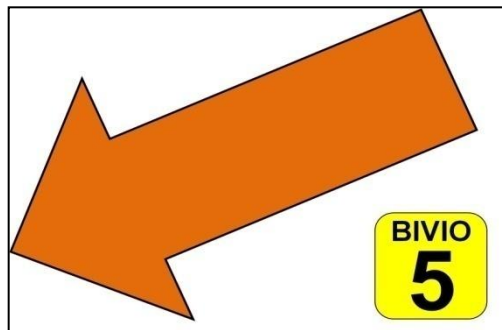
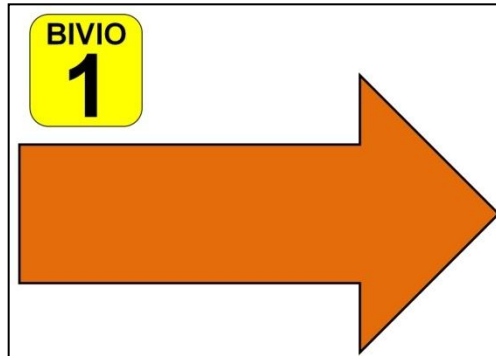
| Fork | Correct Turn |
|------|--------------|
| F1 | R |
| F2 | L |
| F3 | R |
| F4 | R |
| F5 | L |
| F6 | L |
| F7 | L |
| F8 | R |
| F9 | R |
| F10 | L |



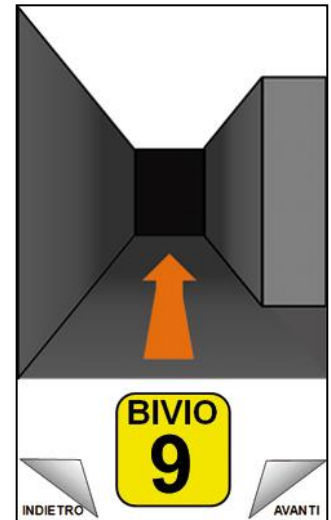
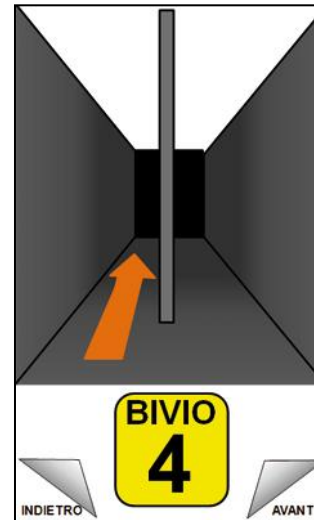
Building the Labyrinths at Montelibretti



The Mock-ups

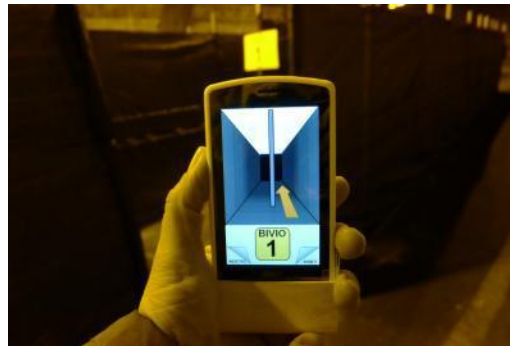


Signs placed at each fork
(Labyrinths 1 and 3)



Indications presented on the smartphone
(Labyrinths 2 and 3)

Materials

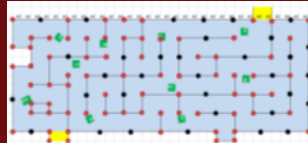


Experimental Procedure

**Participants'
Registration**



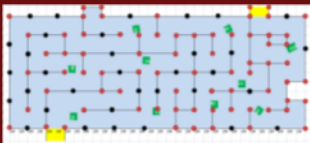
First Labyrinth



**Questionnaire
about the first
Labyrinth**



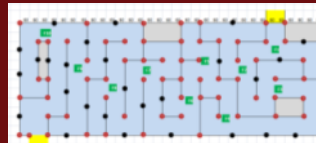
Second Labyrinth



**Questionnaire
about the second
Labyrinth**



Third Labyrinth



Final Questionnaire



Preliminary Results

- On average, the participants spent **nearly twice** the time in labyrinth that had the mobile guidance, than in the labyrinth with the collective guidance (However, large interpersonal differences were found).
- The **workload was significantly higher in the condition with mobile guidance only**, than in the condition where both navigation sources were available ($M=3.1$, $SD=2.45$).
- In the third labyrinth, 30 of the 44 subsets mainly used the collective herding guidance, 2 mainly relied on the mobile guidance, and 12 relied on both systems equally. The **collective guidance was significantly preferred**.
- A difference in the escape time depending on the strategy chosen in Labyrinth 3 (both guidance systems) could not be proven
- When pairs of a grandparent and a child entered the labyrinth with the mobile guidance, in some cases, the grandparents handed the mobile device over to the child. Then, the child led the grandparent to the exit.

Next Steps

- Complete the data analysis, focusing on mean evacuation time, speed, errors per user category
- Provide DSS developers with relevant data
- Draw guidelines for designing personalised and general guidance
- Draw guidelines for designing appropriate training curricula for general public

Questions? Please Ask now...

...or later:

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