

Effect of Workspace Awareness Support on Distributed Team Collaboration

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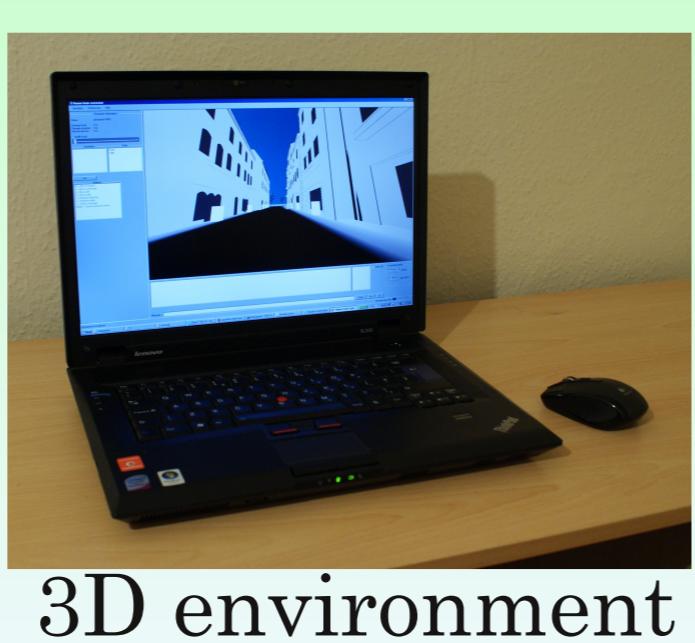
Questions

How can synchronous collaboration aid the work of distributed teams?
What difference is made by workspace awareness support?

Scenario

We used an urban search and rescue scenario. Searchers locate and search buildings, and rescue victims.

The urban environment is simulated on a conventional personal computer.



3D environment

Technology

The tactical actor in the command centre uses a tabletop, while the searcher out in the field uses a handheld.

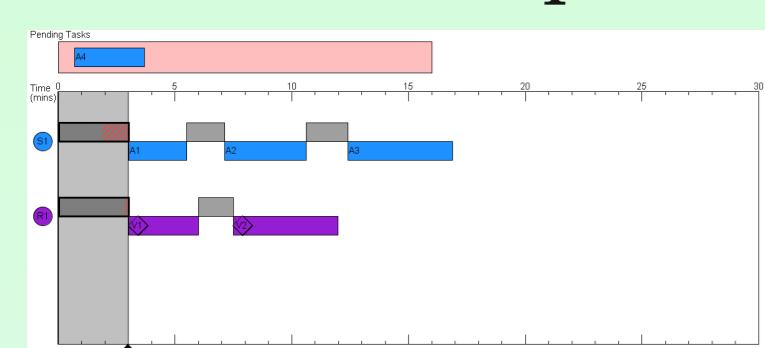


4-projector 6-megapixel tabletop with pen input

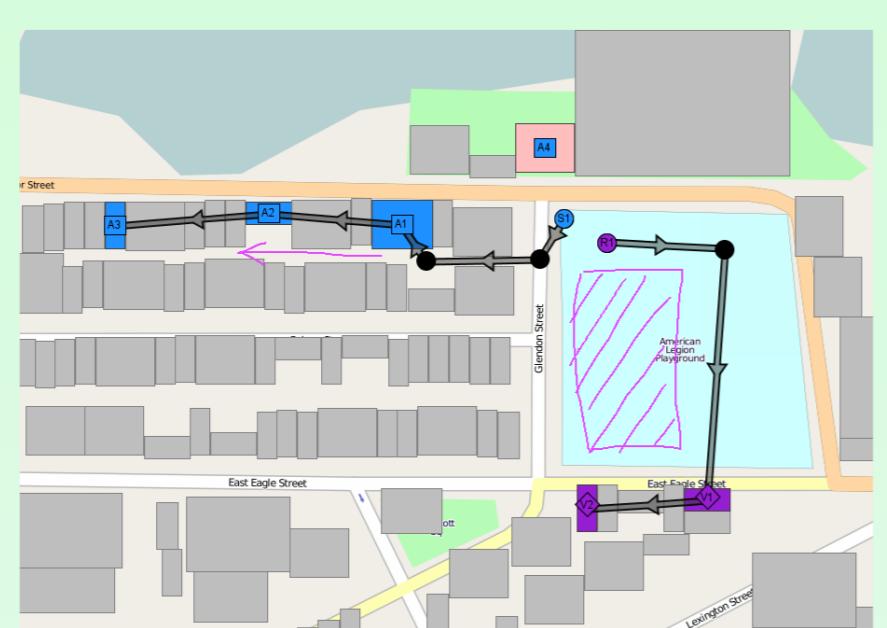


Handheld device with touch input

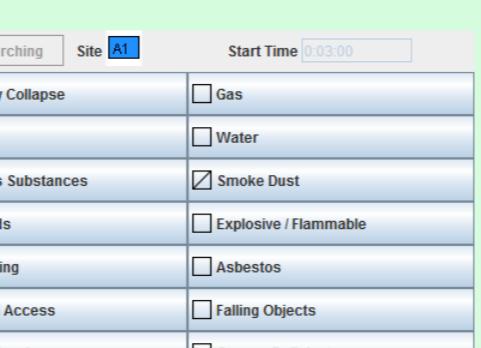
Visual workspaces are shared via the devices:



Timeline

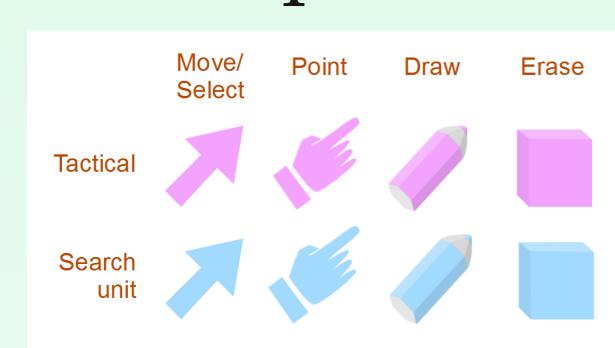


Map

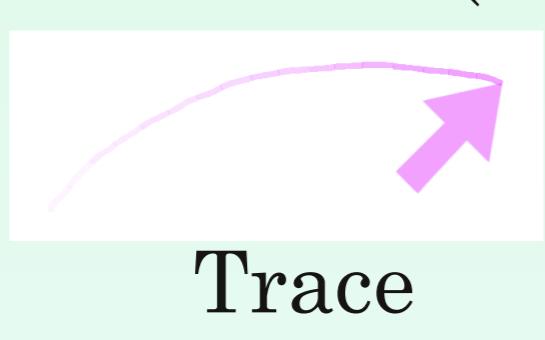


Reports

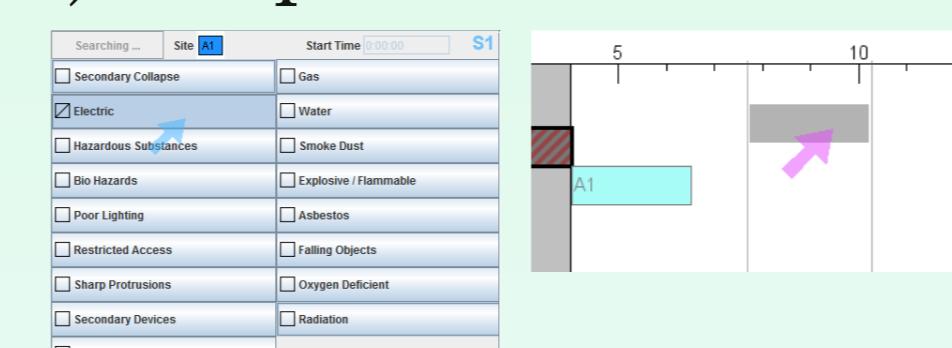
Workspace awareness features (WAFs) are provided:



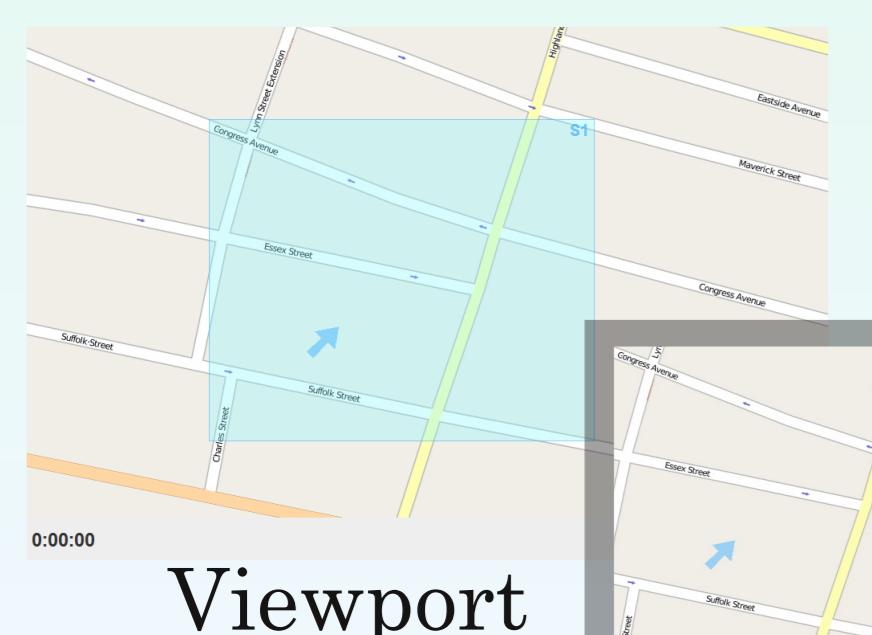
Telepointer



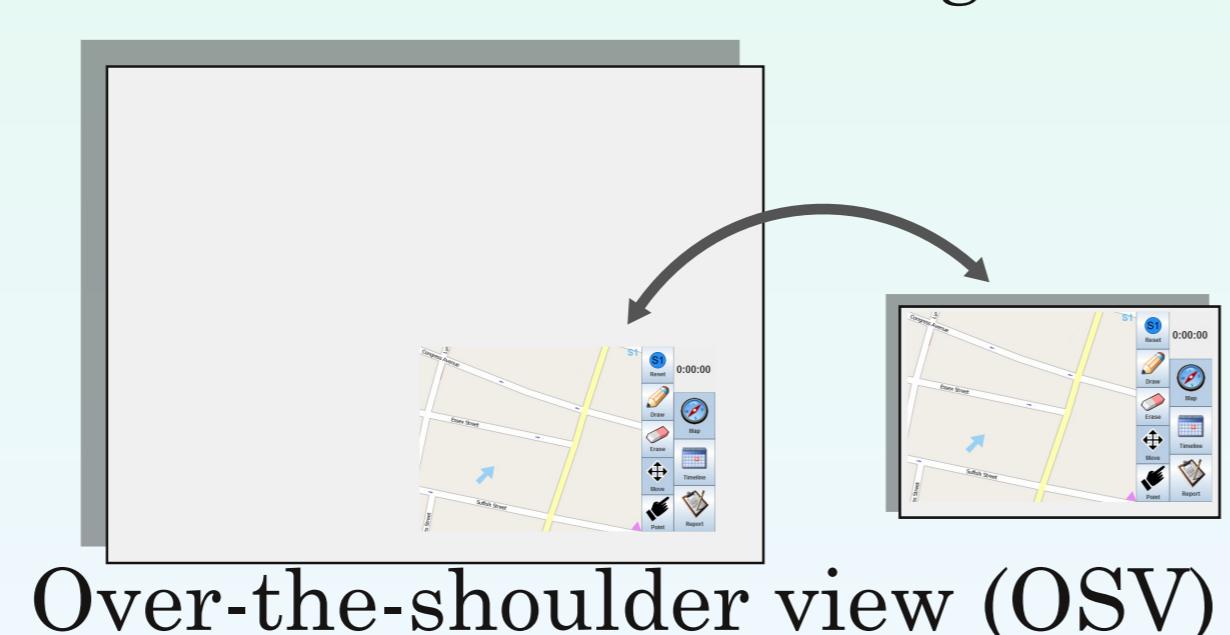
Trace



Feedthrough



Viewport



Over-the-shoulder view (OSV)

Affiliations and Sponsors

THALES

Thales Research and Technology UK
<http://www.thalesresearch.com/>



Humans and Automation Lab, MIT
<http://halab.mit.edu/>

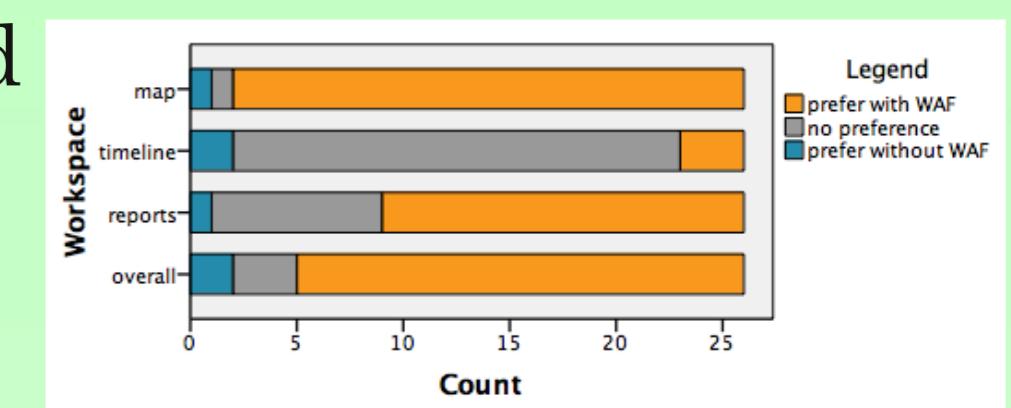
Experiment

13 two-person teams received instruction and practice, then completed two missions: one with the WAFs, and one without. Afterwards, they completed questionnaires and had a retrospective interview. Average time to complete a mission was 18 minutes.

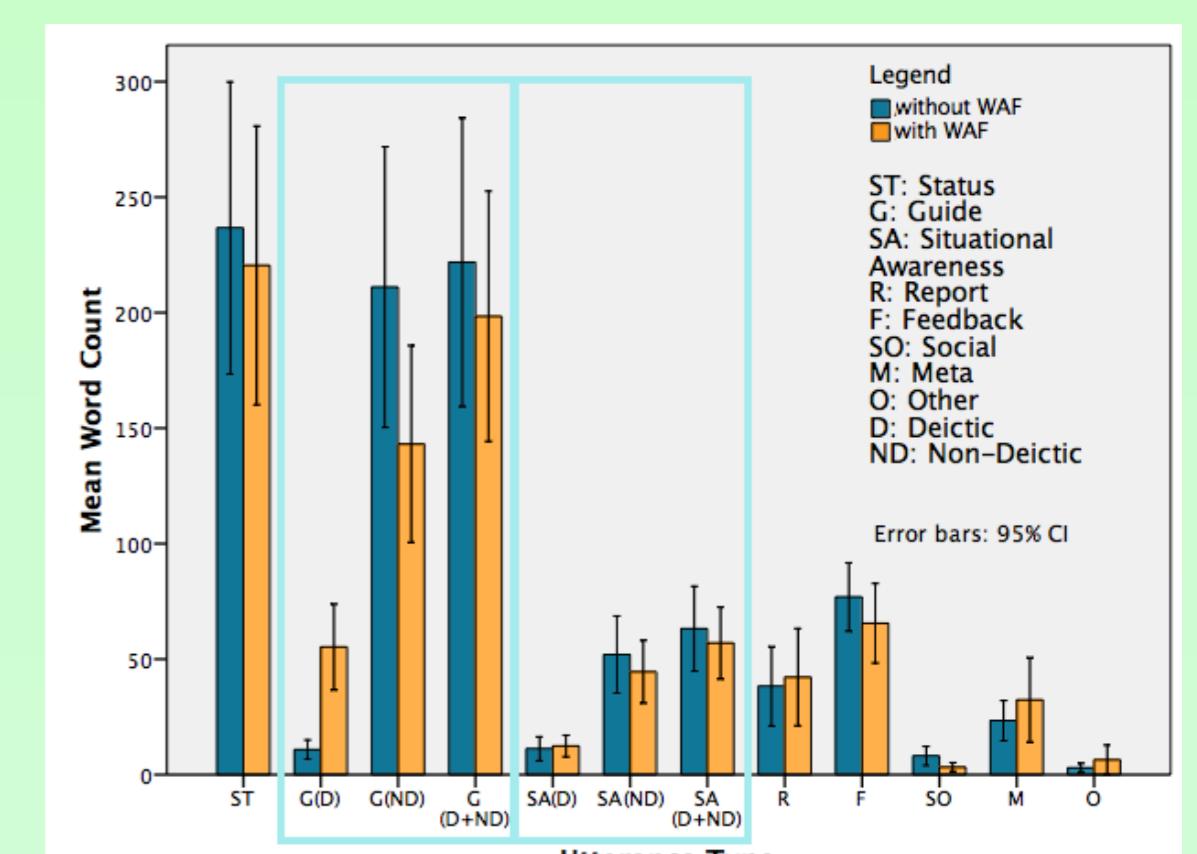
Also, two three-person teams completed missions, to see how the system scales up.

Results

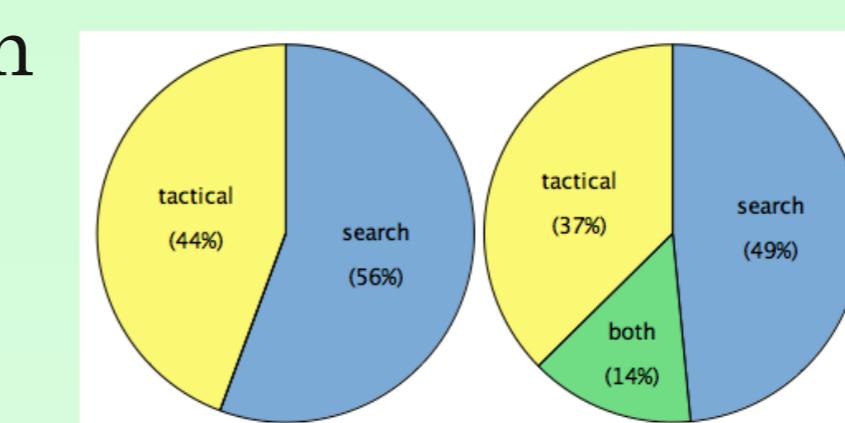
Preference. Participants preferred having the WAFs on the map and reports, but were indifferent on the timeline. For three-person teams only the map showed a difference.



Utterances. With the WAFs, participants did significantly more deictic gesturing.



Completing Reports. Various strategies were used. In two-person teams the task was balanced between participants. In three-person teams the searcher entered all reports.



Who completed the reports? Reporting strategies

Suggestions

- Audio/tactile feedback on handheld device
- Audio feedback on tabletop - it's easy to miss things
- Avoid drawing on touchscreen
- Drag-and-drop symbols
- Heading-up map instead of north-up map
- Activity indicators for searchers on tabletop map
- Semi-automatic tasking and routing
- Camera view on tabletop

Increasing team size

- Searchers must be more autonomous
- Contention for audio channel: speech must be more concise
- Clutter on map: multiple routes, old routes, viewports.
- Switching attention



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