

## Assistive navigational devices that incorporate principles of spatial cognition and imagery

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**Abstract** We investigate a systems approach to developing a new class of assistive devices for the visually disabled. This systems approach consists of a simultaneous exploration of the content of mental representations of space in both the blind and the sighted, the development of a design method that aims at improving the ability of the visually disabled to elaborate mental representations of the space through which they are moving, and the development of socially anchored evaluation methods that ensure our new class of devices serve the needs of the disabled. This systems approach has led us to investigate a new aspect of the experience of the disabled—their personal safety and their perception

of personal security. Safety and security have not been widely studied, except within a narrow definition of physical safety. Hence we use the fundamental research in spatial cognition to probe aspects of mental representations we expect to exploit in the development cycle, we investigate the concepts of safety and security from a social and psychological perspective and focus on the development of new evaluation indicators based on these concepts, and then introduce both these elements into a modified engineering design process and validation cycle. We illustrate the approach in terms of several projects presently under development.

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