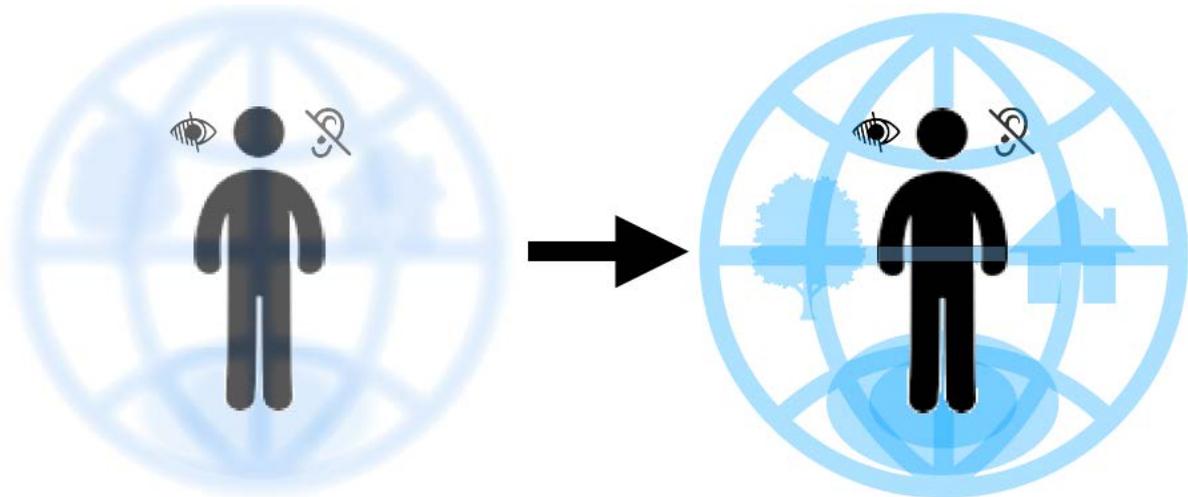


N-SPASE: Navigating Space and the Senses: Deprivation, Mobility, Multisensory Interventions and Wearable Technology

Program Initiative proposal for the NWO TTW Perspectief call 2017 - 2018
<http://www.stw.nl/nl/perspectiefronde2017-2018/programma-initiatief>, P17-26

Keywords: spatial awareness – navigation – sensory deprivation (circumstances & impairments) – multisensory based wearable technology supporting mobility, wayfinding and orientation.



Who we are:

Utrecht University,

Experimental Psychology, Prof. Albert Postma & Dr Nathan van der Stoep

Information and Computing Science, Prof. Peter Werkhoven

Delft University of Technology,

Industrial Design Engineering, Prof. Sylvia Pont & Dr. Jess Hartcher

Vrije Universiteit Amsterdam,

Human Movement Sciences, Prof. Jeroen Smeets

University of Twente,

Human Media Interaction, Prof. Jan van Erp

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What we bring: a multidisciplinary team of researchers with advanced understanding of how the human brain perceives, remembers and interacts with space who want to invest in further development of their knowledge to help developing solutions.

What we are looking for: external partners from clinical and community societies, technological companies, trade and industry companies who are willing to invest time, facilities, staff, technical devices and direct in cash matching to make the N-SPASE program a success. Contributions to the development, design and testing of applications and to research ideas & questions are very much appreciated

Where & When: Matchmaking & Consortium event (please send email to a.postma@uu.nl)

Tuesday 21 November 2017, 16.00 – 19.00.

Grote vergaderzaal, Universiteitsmuseum, Utrecht, <http://www.universiteitsmuseum.nl/>

Food & Drinks will be provided. Program will follow

N-SPASE: Navigating Space and the Senses: Deprivation, Mobility, Multisensory Interventions and Wearable Technology

Spatial navigation (planning and travelling routes to a destination, avoiding obstacles) and spatial awareness are fundamental to human existence. Due to the increasing complexity of modern-day environments, wayfinding and spatial orienting have become a serious challenge in outdoor and indoor, multilevel public spaces such as train stations, hospitals and shopping malls. For instance, spatial challenges include how to easily translate information from 2D spatial maps or from more abstract route descriptions into adequate behavior in 3-D space, and how to accurately sense direction and distance, and build environmental awareness in situations that present an overwhelming amount of different signals and choices, often of poor and fragmented quality.

Navigating the modern world is particularly challenging under sensory deprivation. The 'sense' of space dramatically fails in case of blindness and visual impairments as well as with hearing and vestibular deficits. Problems with spatial orienting can also arise when the environment itself limits the access to certain forms of sensory information. This occurs, for example, when trying to find your way at night, or when fire fighters must navigate through smoke-filled or noisy environments.

The aim of the current proposal is to create a state-of-the art multidisciplinary research program focused on the development of effective multisensory-space support systems that enhance navigation and spatial awareness under such sensory deprived conditions (N-SPASE systems). For the design of these systems, it is essential to have a detailed understanding of the structure of human spatial memory, human wayfinding strategies, and the dynamic interactions between different senses. Inspired by neurophysiological, neuropsychological, psychophysiological, and technological research, we will show that the integrated whole of information from multiple senses is more than the sum of the independent sensory information inputs. This is the essence of the N-SPASE systems. Existing navigation support systems are very limited in that they mainly present information in a visual way for 2-D outdoor navigation and are not aimed at enhancing spatial awareness by combing or replacing sensory input. With the advanced wearable N-SPASE technology (e.g. tactile-auditory orienting devices providing intuitive directional and distance information) complex environmental information can be sensed (indoor as well as outdoor) and remapped between sensory modalities to support or restore navigational functions. Further gains will be obtained by specialized multisensory training programs and by stimulating environmental design innovation to enhance spatial awareness and comfort.

Our research program will address spatial challenges in generic situations with which professionals and society in general are regularly confronted, in parallel with the challenges faced by sensory impaired individuals. A continuous, mutually beneficial exchange of knowledge and technology will take place. We expect that the program will greatly impact the mobility, autonomy, social activity, and professional efficiency of sensory impaired and unimpaired individuals alike. We wish to emphasize that our goals are fully in line with the recent "VN-declaration handicap" effective in the Netherlands from 2016 which aims to promote, protect and ensure the full and equal enjoyment of all human rights and fundamental freedoms by all persons with disabilities. The strong multidisciplinary nature of the program connects to several TopSectors such as Life Sciences & Health, Creative Industries, and Hightech Systems & Materials (and ICT).