

# Human cognitive enhancement tested in virtual city environments

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## ABSTRACT

The presented study focuses on human cognitive enhancement (HCE). Our aim is to map the key moments in interfacing of biology and technology that have the capacity to strongly affect and transform cognitive processes, such as spatial memory and navigation. We hypothesize that long-term use of HCE technology, in or case Augmented Reality (AR) glasses, while navigating through real environment can elicit changes both in spatial memory performance and in brain activity, connectivity and morphology. Proposed experiment focuses on the effect of long-term use (10-12 weeks) of Smart glasses (Vuzix M100). We tested 25 healthy volunteers, who were required to use the Vuzix navigation software when navigating in daily life. Prior to the experiment and during the final 12<sup>th</sup> week all participants (25 experimental and 25 control subjects) underwent complex prospective evaluation. The following test battery was used in order to study the effect of AR glasses wearing on 1) vision (Ophthalmology examination); 2) cognitive abilities (RBANS, CPT, TMT); 3) specific spatial abilities (e.g. Money Road Map test, Perspective Taking Test); 4) eye-movements (eye-tracking) in the route-following and way-finding navigation performance in complex virtual city environment, and 5) brain activity (fMRI navigation task in virtual city, resting state fMRI) and morphology (VBM, DTI). The poster will present pilot data of the currently running experiment.

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**Full papers will be published in the Conference Proceedings and will be freely available to delegates at the conference and online on September 20, 2016.**