

VRCPAT

Virtual Reality Cognitive Performance Assessment Test



ICT has developed an adaptive virtual environment for assessment and rehabilitation of neurocognitive and affective functioning. This project brings together a team of researchers to incorporate cutting edge neuropsychological and psychophysiological assessment into state of the art interactive/adaptive virtual Iraqi/Afghani scenarios (virtual city, virtual checkpoint, virtual Humvee). Two primary goals define these virtual and adaptive environments: 1) a Virtual Reality Cognitive Performance Assessment Test (VRCPAT 1.0) that includes a battery of neuropsychological and psychophysiological measures for diagnostic assessment and treatment of Soldiers with affective disorders, brain injury, or neurocognitive deficits; and 2) a Virtual Reality for Cognitive Performance and Adaptive Treatment (VRCPAT 2.0) that develops an adaptive environment, in which data gleaned from the assessment module (VRCPAT 1.0) will be used for refined analysis, management, and rehabilitation of Soldiers who have suffered blast injuries (varying levels of traumatic brain injury) and/or are experiencing combat stress symptoms (e.g., post traumatic stress disorder).

Virtual Reality Cognitive Performance Assessment Test (VRCPAT 1.0)

The VRCPAT 1.0 includes a battery of neuropsychological measures to assess the ways in which the structure and function of the brain relate to specific psychological processes and overt behaviors: attention-vigilance, workload, effort, abstraction-flexibility, executive functioning, spatial organization, visual-motor processing, processing speed, visual memory, verbal abilities, and verbal memory and learning. The VRCPAT 1.0 is different from traditional paper and pencil neuropsychological tests, in that VRCPAT 1.0 allows Soldiers to experience a greater “sense of presence” as they become immersed within the computer-created environment. Further, the VRCPAT 1.0 neuropsychological and psychophysiological assessments allow task stimuli and parameters (e.g., number, order, and speed) to be consistently manipulated and user responses and behaviors to be closely monitored and automatically recorded. Hence, VRCPAT 1.0 allows for the measurement of complex sets of skills and behaviors that may relate closely to real-world, functional abilities.

Virtual Reality for Cognitive Performance & Adaptive Treatment (VRCPAT 2.0)

The VRCPAT 2.0 takes the neurocognitive and psychophysiological profile information from the VRCPAT 1.0 and uses that information to drive an adaptive virtual environment. The goal is to have an adaptive virtual environment that develops neurocognitive and affective profiles from estimations of the Soldier's cognitive abilities and affective state (from psychophysiological metrics), that may enhance existing cognitive rehabilitation and virtual reality exposure therapy protocols. Such an adaptive virtual environment can adjust the presentation of both the difficulty (e.g., simple versus complex) and intensity (safe versus threatening) of stimuli delivered to the neurocognitive and physiological characteristics of each user.

Facts and Figures

- + VRCPAT is being used to run subjects at Tripler Army Medical Center, Ft. Lewis, Madigan Army Medical Center, West Point, USC and UCSD.
- + VRCPAT has been used in studies with over 400 subjects, including both Soldiers and civilians.

Goals

- + Assessment: Neuropsychological and psychophysiological assessments embedded in military relevant adaptive virtual environments (i.e. Virtual Iraq/Afghanistan City, Humvee, and Checkpoint)
- + Neuroscience: Uncover the relationship between the psychophysiological correlates of neurocognitive functioning in virtual environments for generalization to real world functioning
- + Training: An adaptive virtual environment that can be used for assessment and training of Soldiers
- + Rehabilitation: Assessment, management, and rehabilitation of persons who have suffered trauma (i.e., blast injury, combat stress symptoms)

USC Institute for Creative Technologies

12015 Waterfront Drive // Playa Vista , CA 90094-2536

ict.usc.edu // 310.574.5700 tel // 310.574.5725 fax // info@ict.usc.edu

facebook.com/USCICT // Twitter: @USC ICT // youtube.com/USCICT // ict.usc.edu/blog

