

## A Virtual Reality Exposure Therapy Application for Iraq War Veterans with Post Traumatic Stress Disorder: From Training to Toy to Treatment

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In 1997, researchers at Georgia Tech released the first version of the Virtual Vietnam VR scenario for use as a graduated exposure therapy treatment for PTSD with Vietnam veterans. This occurred over 20 years following the end of the Vietnam War. During that interval, in spite of valiant efforts to develop and apply traditional psychotherapeutic approaches to PTSD, the progression of the disorder in some veterans severely impaired their functional abilities and quality of life, as well as that of their family members and friends. The tragic nature of this disorder also had significant ramifications for the Veteran’s Administration healthcare delivery system often leading to designations of lifelong service connected disability status. Just recently, the first systematic study of mental health problems due to the Iraq conflict revealed that “...The percentage of study subjects whose responses met the screening criteria for major depression, generalized anxiety, or PTSD was significantly higher after duty in Iraq (15.6 to 17.1 percent) than after duty in Afghanistan (11.2 percent) or before deployment to Iraq (9.3 percent)” (Hoge et al., 2004). With this history in mind, the USC Institute for Creative Technologies (ICT) has initiated a project that is creating an immersive virtual reality system for the treatment of Iraq War veterans diagnosed with combat-related PTSD. The treatment environment is based on a creative approach to recycling and adding to the virtual assets that were initially built for the combat tactical simulation and commercially available X-Box game, *Full Spectrum Warrior*.

The first version of the application has been created and is designed to resemble a middle-eastern city, and outlying village and desert areas (see Figs 1-4). The scenario also supports a variety of user perspectives including, walking alone or within a patrol of “flocking” virtual soldiers, and from the vantage point of being inside a vehicle (i.e., HUMVEE, helicopter, etc.). A “wizard of oz” type clinical interface has also been created. This interface is a key element for the application in that it provides the clinician with the capacity to monitor the patient’s behavior and to customize the therapy experience to their individual needs by placing them in VR scenario locations that resemble the setting in which the traumatic events initially occurred. The interface also allows for the gradual introduction and control of “trigger” stimuli in the virtual environment in real-time, as is required to foster the anxiety modulation needed for therapeutic habituation. The virtual environment is currently undergoing user-centered design trials with military personnel with experience in Iraq and with clinicians who have extensive experience in the treatment of combat-related PTSD at the San Diego Naval Medical Center. As well, a system is currently being shipped to Iraq for testing within a U.S. Army Combat Stress Unit. This user-centered feedback is essential for further refining the application in a manner that best addresses the needs of PTSD clients and to maximize the usability of the clinical interface so that therapists with little or no computer experience can optimally apply the VR exposure therapy.



Fig. 1 City view



Fig. 2 Desert view



Fig. 3 Interior view



Fig. 4 Helicopter view

PTSD is of particular concern to the U.S. Department of Defense because its effects can be debilitating. It develops after very traumatic or life-threatening events and can cause flashbacks, sleep problems and nightmares, as well as feelings of isolation and guilt. The Office of Naval Research (ONR) is funding three projects to evaluate virtual reality therapy for treatment of acute PTSD. The three-year, approximately \$4-million program will examine how virtual reality can be used by therapists to treat PTSD in military personnel before the disorder disrupts their lives and careers.

ONR program manager Cmdr. Russell Shilling explains, “Our goal is to provide therapists with innovative tools and techniques for early intervention and treatment of PTSD symptoms. Early intervention is key. Virtual reality therapy has proven effective in treating a wide variety of anxiety disorders (including chronic PTSD) and we hope that it

will be effective against acute PTSD related to combat. We also hope that this type of therapy, with its videogame-like qualities, will resonate well with the current generation of warfighters.” The program is funded through ONR’s Medical and Biological Science and Technology Division.

James Spira of the Naval Medical Center San Diego will work with Ken Graap of Virtually Better, Inc. (Atlanta) and Dr. Albert (Skip) Rizzo and Jarrell Pair from the Institute for Creative Technologies at the University of Southern California (Los Angeles) to evaluate tools to treat PTSD in active-duty military members. Virtually Better will help integrate the sights and sounds of combat, as well as smell and other sensory factors. Rizzo and Pair are developing a flexible virtual reality toolset for therapists, using assets from the U.S. Army’s “Full-Spectrum Warrior” videogame/training application. Brenda Wiederhold at the Virtual Reality Medical Center (San Diego) will work with James Spira and Rizzo as well as other experts on PTSD to study the effectiveness of virtual reality for treating acute PTSD in non-combat personnel such as medics and truck drivers. These service members are exposed to their own unique stresses and require different types of virtual reality scenarios.

Researcher Hunter Hoffman at the University of Washington (Seattle) and Sarah Miyahira of the Pacific Telehealth & Technology Hui (Oahu, HI) will work with Raymond Folen at the Tripler Army Medical Center in Hawaii to also examine the effectiveness of using a virtual reality based cognitive behavioral treatment for U.S. warfighters suffering from acute PTSD.

Clinical treatment trials with the USC Virtual Iraq application are scheduled to commence in June of 2005.