Recent Press on the USC/ICT PTSD Project

Table of Contents:

Associated Press TV, Taped for International Distribution, March 30, 2005
NPR Talk of the Nation, March 24, 2005, Tales of the War at Home.
Newsweek, March 21, 2005, Spectrum of Options, pg.15
Israel 21c: A Focus Beyond the Conflict, March 20, 2005, Israeli researcher at forefront of virtual reality technology.
The San Diego Union Tribune, March 17, 2005, Military to try virtual combat stress remedy.
[http://www.sgnonsandiego.com/uniontrib/20050317/news_2m17virtual.html](http://www.sgnonsandiego.com/uniontrib/20050317/news_2m17virtual.html)
Haaretz, March 7, 2005, Virtual reality trauma treatment for terror survivors unveiled.
The Sydney Morning Herald, March 9, 2005, Virtual reality may aid trauma victims.
NewsTarget.com, Feb. 9, 2005, Virtual reality programs could help soldiers traumatized by war.
[http://www.newstarget.com/004146.html](http://www.newstarget.com/004146.html)
Wired.com, January 2005, It’s not all in your head,
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China View, April 4, 2005, Returning US troops fight combat stress,
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Radio Free Europe, U.S./Iraq: Government Tests High-Tech Treatment for U.S. Combat Stress,
Red Herring, April 7, 2005, Virtual Help for War Stress,
Coming up:

*Speigel TV,*

*ABC* and *CBS* have now made contact to schedule and interview.

*LA Times,* Feature in progress

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**Official USC Press Release:**

**Virtual Reality to Treat Stress in Iraq War Vets**

[http://www.usc.edu/uscnws/stories/11070.html](http://www.usc.edu/uscnws/stories/11070.html)

USC scientists who developed virtual reality technology to train soldiers are using the same tools to help returning troops cope with traumatic events. The project is a merger of game development, computer graphics, psychology and VR simulation.

By Usha Sutliff

Scientists at the USC Institute for Creative Technologies are converting content from a game designed to teach soldiers about leadership and tactics into a therapy tool to treat Post-Traumatic Stress Disorder in soldiers returning from war in Iraq.

The project is headed by ICT Research Scientists, Albert "Skip" Rizzo and Jarrell Pair and is being funded by the Office of Naval Research.

The virtual-reality PTSD assessment and treatment system has adapted assets from virtual scenarios originally developed for the game Full Spectrum Warrior (Xbox), in combination with newly created next-generation graphic content developed at the ICT.

Collaborators at the San Diego Naval Medical Center and Camp Pendleton will use these tools to test its efficacy for treating acute PTSD in Iraq War veterans. The project is part of a clinical trial that partners USC with Virtually Better, the Atlanta-based group that had previously developed the "Virtual Vietnam" PTSD application in 1997. In addition to validating the scenarios with clinicians who are expert in treating combat-related PTSD, researchers will also solicit feedback about the accuracy of scenarios from actual soldiers in Iraq via a partnership with Ft. Lewis Army psychologists, Col. Greg Gahm and Cpt. Greg Reger.

"We're taking something that was already developed at USC and retooling it for a different purpose," said Rizzo, also a research assistant professor in the USC Leonard Davis School of Gerontology. "It just makes sense to see the application go full circle like this."

The commercially successful Full Spectrum Warrior is a combat simulator developed in conjunction with personnel from the Army's Infantry School at Ft. Benning, Ga. The game, billed as "the authentic Army experience," puts the player in an urban fighting environment.
The new project will adapt and add to those virtual environments, transform them into combat areas in the Middle East and, under the watchful eye of a trained psychologist, gradually expose the soldiers to stimuli that resemble the traumatic events that created their disorder.

The most efficacious approach to treating anxiety disorders such as PTSD has been cognitive behavioral therapy, Rizzo said, where the patient is gradually exposed to what he or she fears. This is the classic approach used to treat common anxiety disorders such as fear of heights, fear of flying or fear of public speaking.

But post-traumatic stress disorder is both more complicated and more generalized.

"With PTSD, you have a more intense anxiety response based on traumatic events that are typically outside the sphere of normal human experience," he said.

The challenge comes in exposing the soldiers to stimuli that bring them back to a traumatic event - such as seeing someone getting shot or shooting someone - while not traumatizing them all over again.

One way to address this challenge is to gradually expose the patient to stimuli that resemble the traumatizing event, but within the safety of a supportive clinical setting. In this project, the clinician will have control over every aspect of the virtual reality environment, changing scenarios, sounds, weather and the intensity of the experience. One goal of the treatment will be to create an emotional response in the patient that he or she can then work through with the therapist in a supportive environment.

"Our aim here is not to re-traumatize the person, but rather to re-expose them to relevant traumatic events in a graduated way that they can handle," Rizzo said.

"You want to help the person manage their emotional responses in a way that makes them more functional in their day-to-day lives and relationships."

"For example, when a car backfires, you want to help them get to the point where they don't have a flashback of a gun going off." he said.

This is not the first time patients have been immersed in a virtual environment to help them cope with traumatic events. The approach was first used in 1997 by the Virtually Better group, to treat Vietnam veterans with PTSD and later to treat survivors - such as firefighters - of the 2001 World Trade Center attacks. VR is also being tested as a treatment for PTSD in survivors of terrorist bus bombings in Israel.

The difference may be the highly advanced technology now being used. Because of the groundwork laid by Full Spectrum Warrior, Iraq War vets will be stepping into a virtual world that took millions of dollars to create. Due to the urgent need for such innovative PTSD treatment tools and since the ICT scientists were able to recycle many of these assets, the prototype version currently at Camp Pendleton will be the first of its kind to be tested with returning soldiers from the Iraq War, in collaboration with Dr. Brenda Wiederhold from the Virtual Reality Medical Center. Eventually, Rizzo said, he envisions a scenario in which every returning soldier, sailor, airman and Marine is screened for PTSD using this new tool.

"It's a nice merger between game development, computer graphics, psychology and all of the engineering technology that goes into creating virtual environments," Rizzo said.

"Our goal," he said, "is to help military personnel begin to manage the difficult emotions that are sometimes the byproduct of combat-related experiences. And with recent reports coming out suggesting "Vietnam-Levels" of PTSD in returning Iraq War soldiers, we are working on this project with great urgency."

The ICT partnered with the U.S. Army in 1999 to create virtual reality tools that would train troops to be better leaders and decision makers in the field. In November 2004, the Army extended its previous
contract by five years and awarded ICT $100 million - the largest research contract ever received by USC.

The union has proven to be a successful one, with ICT standing squarely at the intersection of the U.S. military's desire for more sophisticated training tools and the multibillion gaming industry's desire for more realistic combat scenarios.

Professor Rizzo presented this project at the Dept. of Veterans Affairs sponsored conference "Wounds of War – Rehabilitation Strategies for Recovery" at the Providence VA Medical Center on March 16, 2005.

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Virtual Reality War Games Being Adapted to Treat Post-Traumatic Stress Disorder
[ Listen ]
The USC Institute for Creative Technologies developed the X-Box game "Full Spectrum Warrior" under a partnership with the US Army to create combat simulation games for military training. Now, scientists at the USC-ICT are converting that game into a therapy tool to treat PTSD in soldiers returning from Iraq, for symptoms ranging from flashbacks to depression. Dr. Albert "Skip" Rizzo, one of the developers of the new prototype, joins Kitty to talk about the game, which is currently being tested at Camp Pendleton under a three-year clinical trial.

For more information visit: www.ict.usc.edu

Analysis: Tales of the war at home

March 24, 2005

NEAL CONAN, host: This is TALK OF THE NATION. I'm Neal Conan in Washington. Our image of war on the home front is inevitably associated with World War II--scrap metal drives, Rosie the Riveter, booming industrial growth and the loss of so many young men at Guadalcanal, Kasserine Pass, Tarawa. Two years after the start of the war in Iraq, equally strange-sounding names have become familiar: Fallujah, Baqubah, Mosul. But the war at home is more illusive. Today, we hope you'll call to tell us how the war in Iraq affects your neighborhood, your town, your church or business, and we'll call out to companies making new products and hiring new workers to a state official facing a shortage of firefighters and police to the principal of the grammar school on a military base. Those are their stories. We want to hear yours. Call and tell us how the war in Iraq affects your part of the home front. Our number here in Washington is (800) 989-8255; that's (800) 989-TALK. And the e-mail address is totn@npr.org.

CONAN: The military's testing a new technology they hope will help servicemen and women who return from Iraq with post-traumatic stress disorder. To tell us more about it, joining us now is James Spira, the lead investigator in the virtual reality study.
Nice of you to be with us today, James Spira.
Mr. JAMES SPIRA (Navy Medical Center): Thanks, Neal.
CONAN: Tell us how this new technology works.
Mr. SPIRA: Well, to some extent it's not really new technology. Psychotherapy has been used for patients with post-traumatic stress disorder from a variety of different causes for years, and it's been shown to be really quite effective, especially what we call exposure therapy. Exposure therapy is when you teach someone how to relax, focus in the moment, be comfortable in their body, and then gradually expose them to triggers that previously would send them off and cause quite a bit of arousal.
CONAN: So relive the experience.
Mr. SPIRA: To some extent, but relive it in a new way. The problem is for returning troops, for example, a backfire from a car, somebody yelling suddenly behind them, aircraft going overhead can trigger pretty horrendous memories and feelings. What we're doing now with this new technology is using virtual reality environments to progressively introduce those type of elements...
CONAN: So...
Mr. SPIRA: ...but at the same time teaching the troops how to relax, be comfortable, focus in the moment so they can better tolerate those.
CONAN: ...they go through a virtual Baghdad or a virtual Fallujah?
Mr. SPIRA: That's right. Exactly. We have a virtual city that our partners in this research at the University of Southern California Institute for Creative Technologies is developing that actually scans in scenes from Fallujah, scenes from medical tents and convoys, so that we can gradually expose these troops to them as they're able to tolerate it.
CONAN: And I've got to...
Mr. SPIRA: Eventually these things won't bother them anymore.
CONAN: I can understand obviously they've got the visual component and the sound, but there's a lot more to the experience than just that.
Mr. SPIRA: There is. We're also going to be introducing some heat. We'll have a fan blowing heat on them because, as you know, it's quite hot over there and dry. They'll have smells, burning tires, even burning flesh some of them, say, but it's not that we have to introduce them to the exact same stimulus they had. All we have to do is trigger their memories, which doesn't take a whole lot, frankly, at this point. They had such horrendous experiences that we just want to be able to trigger those memories so that they can learn to gain mastery over them rather than have those thoughts and feelings control them.
CONAN: How's it working?
Mr. SPIRA: It works pretty well. We teach them how to relax. We use biofeedback so that we can monitor their physiological reactions. We talked to them about what's going on so we get the subjective reactions. We teach them how to relax, be comfortable in a couple sessions, and then we start introducing these images in the virtual world that they can move around, they can interact in for about eight to nine sessions. And at the end of that time, they tend to do pretty well.
CONAN: And what's the feedback from the men and women who have been using this equipment?
Mr. SPIRA: Well, this is the early stages and we're really developing the software now, but the early feedback is, 'Wow, this is pretty realistic.' We don't want to make it absolutely realistic. We want to make it somewhat cartoonish so that they don't feel overly immersed. We want them to have a sense of distance from these images and from these feelings. It's just enough to trigger their automatic reactions, so they can make them under their control. It works pretty well.
CONAN: Yeah. Interestingly, the military used virtual realities of Baghdad, for example, to help train troops before the war to give them an idea of what they would experience when they went into Iraqi cities, and now you're doing the same thing, in a way, on the way out.
Mr. SPIRA: That's exactly right. In fact, a lot of the games that are around that kids use in PlayStations and Xboxes have been developed initially for the military for these trainings and exposures, almost like flight simulators to train pilots.
CONAN: Hmm.
Mr. SPIRA: And we're turning that around now and helping the troops be able to adapt better to their return back to the States.
CONAN: James Spira, thanks very much.
Mr. SPIRA: Sure. Happy to talk with you.
CONAN: James Spira is head of the health psychology division at the Navy Medical Center in San Diego, California, lead investigator on the military's virtual reality studies.
SAN DIEGO -- Joseph Blythe settled into the couch in the psychologist's office, slipped on a pair of high-tech goggles, took hold of the joystick and within a few seconds was transported through time and distance back to Iraq. He walked briskly along the maze-like urban streets, scanning the rooftops for friend or foe, passing by bombed-out cars, listening to the roar of choppers flying past the palm trees.

As he reached an alley, Blythe heard the whoosh of a bullet going past his head and flinched.

"That was scary," he said.

Military psychologist James L. Spira uses virtual reality to treat patients who have post-traumatic stress disorder. (Ariana Eunjung Cha -- The Washington Post)

Blythe, a 25-year-old medic who spent eight months with the U.S. Marine Corps in Fallujah during its most turbulent period in 2004, is among the first to test a new virtual-reality system that the military hopes will help servicemen and women suffering from post-traumatic stress disorder.

The idea behind the treatment is counterintuitive. It forces the troops to do the last thing they want to do: relive the experience.
By confronting a make-believe Iraq, military scientists hope, patients will be able to assert better control over their memories. The intent is to stop the nightmares, outbursts of aggression and other readjustment issues that afflict many returning Marines, soldiers and sailors.

As the fighting in Iraq enters its third year, the U.S. military is grappling with what threatens to become a mental-health crisis in the armed forces. A New England Journal of Medicine study published this year estimated that one of every six Army soldiers returning from the war zone experiences major depression, anxiety or post-traumatic stress disorder. Many others, such as Blythe, report milder symptoms.

"Our minds aren't made to process that much death," he said. "Whoever goes to Iraq and comes back and says they have no problems is either in denial or is lying."

The virtual-reality experiment is among the most innovative efforts the government is launching. Among others: military-sponsored support groups for returning fighters, a mock house at a rehabilitation center to teach wounded troops to care for themselves before going home, combat-stress units to counsel personnel on the ground, and psychological questionnaires to earlier identify problems among returning troops.

Although the virtual-reality program is a relatively new idea, military doctors were impressed with results they saw when it was used with survivors of the World Trade Center attack.

In one case, it helped a 26-year-old executive work through her stress after the destruction of the towers. She had flashbacks so frequently that she couldn't sleep, refused to watch TV news and became intensely angry about minor things. Efforts to try to get her to revisit the events yielded "a flat emotionless tale," her therapists wrote in a research report. But when she was exposed to the scenario gradually over a 14-week virtual-reality program, she began to open up. She said that as she struggled to flee the area through a crush of falling bodies, a woman had called out to her. She remembered meeting the woman's eyes and thinking that if she stopped to help, she might not be able to make it out. She looked down to see that the woman's legs had been severed.

Once she had unearthed that memory, her symptoms receded.

The high-tech treatment may be more appealing to the macho culture of the military than traditional counseling, said Russell Shilling, a medical director at the Office of Naval Research in Arlington, which is funding the study. It is estimated to cost at least $4 million over three years and will compare the effect of virtual-reality exposure to having people revisit events by imagining the scenarios.

"There's still a stigma to seeking mental-health therapy," Shilling acknowledged. He hopes more troops will be open to the virtual-reality technology because it is like a video game.

The terrors in Iraq are of a variety and intensity that, many say, has been unseen since the Vietnam War: masked insurgents ambushing even humanitarian and reconstruction convoys, makeshift bombs at every turn in the road, Internet videos of kidnapped victims being beheaded.
The mounting U.S. death toll, coupled with the stress of uncertain deployment times and multiple rotations, add up to intense stress.

When fighters return home, many find themselves trapped between two worlds. The sound of a car backfiring -- or even a certain type of food -- may evoke a memory of Iraq.

"The events keep coming back. They have nightmares, flashbacks. They can't get away, and they want to get away," said James L. Spira, a staff psychologist at the Naval Medical Center in San Diego who is a lead investigator in the virtual-reality study. Some turn to alcohol or drugs to block out the experiences, he said.

At first, said Sarah Miyahira, who works for the Department of Veterans Affairs in Honolulu, post-traumatic stress disorder may manifest itself as "simply a sensation, a deep pit in their stomach. . . . The human psyche protects itself by repressing memory but . . . you're not going to have a whole sense of control if you don't understand what causes you to react the way you do."

The standard treatment is antidepressants plus "talk therapy." Virtual-reality scenarios are considered a supplement.

Within a few months, the virtual-reality treatments will begin to be offered to troops at three locations: the Naval Medical Center and Camp Pendleton Naval Hospital in California -- which together hope to enroll roughly 180 patients -- and Tripler Army Medical Center in Hawaii, which hopes to enroll about 75.

The system used in California, which is based on the video game Full Spectrum Warrior, puts the patient in the middle of a city. Therapists will gradually expose the patient to more radical scenarios. In the first session, the scene might be an empty street. In the second, other troops or civilians might be added. Near the end of the treatment -- which could last weeks or months, depending on the person -- the patient may be put through a full-scale attack. Researchers say they also plan to introduce smells and to superheat the treatment room to the 100-degree-plus temperatures the patients experienced in Iraq.

"We're trying to discourage them from escaping," said Hunter Hoffman, a research scientist at the University of Washington who is working on the Hawaii program. That one will simulate a convoy drive.

The virtual-reality scenarios serve as conversation starters between patient and therapist, who then try to pinpoint the event that triggered the syndrome. One possible complication is that the patients' experiences are varied and complicated and are not necessarily linked to a single incident.

The researchers worry that the technology may turn out to be just a distraction, a gimmicky, new-age twist on traditional therapies that may not work as well -- or, worse, that it could end up aggravating some patients' conditions by re-exposing them to their traumas too quickly if it is not used by a skilled therapist.
To avoid that, the therapists will make use of biofeedback sensors, measuring heartbeat, breathing, temperature and moisture on the skin. These statistics will help doctors determine the patients' reaction to certain stimuli -- such as the sounds of Arabic-accented voices yelling at them, helicopters landing and mortar shells striking -- and whether they are nearing the edge of what they can tolerate.

"We are not developing a self-help tool. This is something that needs to be used hand in hand with the help of a good clinician," said Albert Rizzo III, an assistant professor at the University of Southern California who is collaborating with Spira.

On a recent afternoon, while Blythe was immersed in the virtual Iraq, Spira was a few feet away controlling the environment. With his computer, the psychologist was changing the weather, the time of day, the sounds.

Blythe, who said he suffers from milder aspects of post-traumatic stress syndrome, is helping Spira work out the kinks in the system before the treatment is offered to those with major post-traumatic stress disorder.

Although Blythe is able to do his job as a medical technician, he has nightmares, thrashes in bed at night and gets spooked by large crowds because they remind him of how insurgents would surround themselves with innocent people, making it difficult to tell who the real enemy was. (He hasn't been to a mall since his return in October and doesn't like to go to bars anymore.)

He told Spira that the colors of the day and night sky are exactly right and the sound of the helicopters is realistic but that the streets are too clean; trash was everywhere in Iraq, he said. He suggested making the chair vibrate like a Humvee on a dirt road. He also noted that the sound of machine-gun fire in the background has become so commonplace in the war zone that it needs to be ratcheted up in the simulation to have an effect. He said the virtual-reality system hasn't produced a strong reaction in him, "not so much, not yet."

But his instinctive reaction to the bullet passing by so close surprised him. "In the end," he said, "I think the noises is what'll get people."
soldiers in urban warfare into a tool to treat posttraumatic stress in veterans returning from Iraq. USC researcher Albert (Skip) Rizzo says that therapists can choose from six settings on Full Spectrum Warrior—ranging from urban interiors to rural villages—and adjust the time of day and weather. They can trigger events, too, like gunfire and explosions. Says Rizzo: “We can put the patient in a simulation that resembles the Iraqi environment and deliver trigger stimuli in a controlled environment,” rather than relying on patients’ memories and imaginations to help them confront their traumas.

—N’gai Croal  http://www.msnbc.msn.com/id/7160260/site/newsweek/
Israeli researcher at forefront of virtual reality technology
By Leora Eren Frucht   March 20, 2005

Most people have never witnessed a terror attack. But the graphic depiction of a suicide bus bombing on the computer screen that Prof. Patrice (Tamar) Weiss is displaying seems vividly real.

Watching it - in three dimensions and full sound while wearing a head-mounted display helmet - may help hundreds of Israelis who have witnessed real terror attacks overcome post-traumatic stress disorder (PTSD), and is the basis of a new therapy for treating particularly resistant cases of PTSD.

The treatment is just one of dozens of novel applications of virtual reality (VR) technology which were demonstrated recently at the University of Haifa during the Third VR Symposium.

Weiss, the person who brought together many of the world’s leading VR wizards - and who is herself involved in several cutting edge VR applications, is a strictly observant Israeli who lives in the ultra-Orthodox neighborhood of B'nai Brak.

"It's not exactly normal," admits Weiss to ISRAEL21c, laughing at the contrast between her traditional way of life and the 'Brave New World' that characterizes her professional pursuits.

But Weiss sees no contradiction between the two. "I have always been interested in different technologies and my goal has always been to help people," says the researcher, whose library has volumes of Psalms and kinesiology textbooks side by side.

An occupational therapist by training, Weiss grew up in Canada and taught at McGill University in Montreal for many years, before immigrating to Israel in 1991 with her Israel-born husband. For the last four years she has been a researcher and lecturer at the University of Haifa, and a member of its newly-established Laboratory for Innovations in Rehabilitation Technology.

Weiss's interest in VR was piqued when she read an article by one of the pioneers in the field, Prof. Albert 'Skip' Rizzo of the University of Southern California, nearly a decade ago. That ultimately led to a close collaboration with Rizzo, who also attended this month's symposium.

What interests her about the field?

"Look at this," says Weiss, showing a videotape of a woman with a spinal cord injury doing traditional physiotherapy. The therapist hands her a plastic ring which she must grasp without losing her balance - then another ring, and another, and another. "Let's face it. It's very static and very boring."
Now she shows a videotape of another patient who is also learning to balance himself - only he is watching himself on a giant screen, against a breath-taking mountain backdrop, swatting at balls in the sky. Every ball he hits turns into a colorful bird. The scene is virtual, but the man’s movements - he is leaping and swatting with increasing determination - are very real.

"It's interesting and motivating," explains Weiss. "I have yet to meet a patient - of any age - who didn't like it. So it's very effective." (In a newer version, she notes excitedly, patients will wear a glove which vibrates whenever they make contact with a virtual ball - further increasing the sense of reallness.)

The symposium Weiss organized, which brought leading VR experts from the US, Canada, Europe, Japan and Israel, to Haifa showed the dizzying range of new VR technologies dedicated to health and rehabilitation - from a robotic dog, who can be a reliable companion for the elderly - "no need to feed him or take him for walks," noted the researcher who demonstrated the small, black, yelping Sony invention - to 3D interactive games that could some day be used for early diagnoses of Alzheimer's disease, treatment of attention deficit disorder, and rehabilitation of patients who have suffered central nervous system injuries.

"Virtual reality has completely revolutionized the field of occupational therapy," says Weiss, who is personally involved in several innovative VR projects, including the simulated bus bombing program designed to treat Israelis suffering from severe post-traumatic stress.

That program - developed together with Dr. Naomi Josman, Prof. Eli Somer and Ayelet Reisberg, all of the University of Haifa, as well as with American researchers - is designed to expose patients in a controlled manner to the traumatic incident which they are often unable to remember, but which has a powerful and debilitating effect on their lives.

The realistic rendering of the bus bombing triggers the patient’s memories - the first vital step on the path to overcoming trauma. (The simulation does not include all the gruesome details of the attack, but rather just enough to help the patient recall what happened.)

It was Josman who first came up with the idea of using such a treatment in Israel. She was attending a conference in the United States when she saw how University of Washington Prof. Hunter Hoffman had applied VR to successfully treat Americans suffering from PTSD following the 9/11 attack on the Twin Towers.

Similar programs have also been used recently to help American veterans traumatized by their tour of duty in Iraq, and even Vietnam veterans for whom no other treatment has proven effective.

Through close collaboration with Hoffman, the U. of Haifa team developed an Israeli version of the program which is now being used to treat the first few patients.

"If our pilot study is effective, we will launch a full-scale clinical trial," says Weiss, "and hopefully we will be able to provide a solution for those PTSD patients who have been resistant to more traditional cognitive therapy."

In another application of VR technology, Weiss and U. of Haifa colleagues have developed a
program to help stroke victims re-learn the basic skills required to shop on their own. The patient composes a grocery list and makes his or her way through a 'virtual supermarket,' seeking the right products, pulling them off the shelves and into a shopping cart, while announcements of sales are broadcast on the loudspeaker system.

"It's the first such program designed to improve both cognitive and motor skills of stroke victims," she notes.

Last week, the American Occupational Therapy Foundation (AOTF) invited Weiss to join its Academy of Research, the highest scholarly honor that the AOTF confers.

"Your work clearly helps to move the profession ahead, and demonstrates powerful evidence of the importance of assistive technology in helping persons with disabilities participate in the occupations of their choice, while improving the quality of their lives," the AOTF wrote in its letter to Weiss.

For Weiss, virtual reality is not only the focus of research, but a way of life - at least in her work. She communicates with her colleagues around the world by tele-conference and, of course, email - and notes that she has never even met her close collaborator Hoffman even though they have been communicating several times a week for years.

She also taught an entire university course last semester - without ever attending a lecture hall. Instead, she sat in the comfort of her B?nai Brak home, wearing a headset and microphone to deliver a weekly videoconferenced lesson on assistance technology to students who sat in their own homes.

"They could see a video of me, and whenever a student wanted to speak I would see the icon of a hand being raised. We even had guest lecturers from abroad. The students really appreciated not having to come to the university late at night for the course," says Weiss, who was pleased to be able to - once again - harness technology to help make people's lives a little easier.

"I believe in practicing what I preach."
Military to try virtual combat stress remedy
http://www.signonsandiego.com/uniontrib/20050317/news_2m17virtual.html

By Rick Rogers
STAFF WRITER
March 17, 2005

Research at Naval Medical Center San Diego and Camp Pendleton later this year will try to determine whether virtual reality can combat post traumatic stress disorder. The three-year, $2.7 million study is part of the military's effort to develop more ways to treat the often disabling mental condition.

If the virtual reality procedure succeeds, it could augment counseling for the disorder at military bases nationwide, said Dr. James L. Spira, a psychologist at Naval Medical Center, often referred to as the Balboa naval hospital.

The center began receiving equipment for its study this week. During the next six months, Spira said, the Navy will interview Marines and sailors and work with software makers to develop the most realistic virtual environment possible.

"The Office of Naval Research is very interested in finding out how effective virtual reality therapy is compared to traditional cognitive therapy," he said.

The aim of virtual reality therapy, he said, is for sailors and Marines to confront the source of their problems gradually.

"We don't want it to be too realistic, to create more trauma," Spira said.

Early data suggest that 16 percent to 20 percent of the hundreds of thousands of troops returning from Iraq have shown signs of post traumatic stress disorder. The condition is often characterized by flashbacks, anger, isolation and depression that can last for decades.

More than 40,000 Marines and sailors have been deployed from San Diego County to Iraq since Operation Iraqi Freedom began in 2003. At least 200 have
been killed and several hundred more wounded.

In the summer, The San Diego Union-Tribune ran a story about Camp Pendleton-based Marines suffering from post traumatic stress. At the time, the base’s mental health officials said more than 400 Marines were in counseling for the condition. These officials have not responded to requests for updated numbers.

Amy Rohlfs, a spokeswoman for the Naval Medical Center, said she didn’t know how many sailors and Marines were being treated there for this disorder.

The experimental program "Virtual Iraq" uses state-of-the-art technology. It's based on a virtual reality video game, said Albert Rizzo, a professor at the University of Southern California who is helping to establish the study.

"Virtual Iraq" aims to re-create the traumatic events that triggered post traumatic stress symptoms by using wartime images, sounds, movements and smells typically found in Iraq.

As one type of exposure-based therapy, virtual reality treatment has shown promise in helping Vietnam veterans and World Trade Center attack victims suffering from the disorder.

The planned study will track 120 sailors and 40 to 60 Camp Pendleton-based Marines diagnosed with post traumatic stress. They will be monitored for six months at staggered intervals.

Participation will be voluntary, and the virtual reality treatment would be in addition to the more traditional cognitive, or talk, therapy. "I want to make it clear that we are not using our troops as guinea pigs," Spira said. "Our prime concern is to help the sailors and Marines heal and return to their work and to make sure they are safe in returning to work."

Navy Cmdr. Paul Hammer, program director for the psychiatric residency training program at Balboa, yesterday demonstrated the virtual reality therapy. Hammer recently returned from Iraq and was with Marines in the winter when they took Fallujah in bloody, close-quarters combat.

Spira began the program after Hammer put on a headset and attached to his body several monitors that measure vital signs. Laptop screens showed Hammer’s movements, which he controlled with a joystick, through an simulated Iraqi street. Sounds of children crying and his virtual footsteps flowed from the monitor.

"Go home, cowboy," said a man with an Arabic accent.

Spira first clicked for gunfire and then for the sound of helicopters. Then he created a sandstorm and changed conditions from night to day.

"It's pretty realistic. I like the sounds. The scenes look real," Hammer said during the process. "That's pretty wild. Can I have a gun?"
Virtual reality trauma treatment for terror survivors unveiled

By The Associated Press

Researchers are offering survivors of Palestinian suicide bombings and U.S. veterans of the Iraq war a new trauma treatment - revisiting painful scenes through virtual reality.

New simulation technology and pilot projects for trauma victims were presented Monday, as part of an international three-day conference at the University of Haifa. Virtual reality is a computerized environment created to give people the feeling of being somewhere they're not.

One program will be tested next week on 80 U.S. soldiers who returned from Iraq and have shown symptoms of post-traumatic stress disorder, including depression and anxiety. The tests will take place at Camp Pendleton and at the San Diego Naval Hospital, both in California, a creator of the program said.

Haifa University researchers, meanwhile, have "recreated" a bus bombing that went off in the city in March 2003, killing 17 people. The team has already tested the program on one witness of that bombing, but said it is too early to tell whether treatment is successful. The Haifa researchers plan to begin a study of more bombing survivors soon.

Naomi Josman, head of the occupational therapy department at Haifa University, said the program allows the patient to make a gradual choice to interact - or not - with the explosion, followed by rattling vibration, sirens and people shouting.

Virtual reality was first used to help trauma victims after the 9/11 terror attacks on New York and Washington. Ten subjects have been treated in a program developed by the University of Washington.

In a video tape shown at a preview of the conference, New York firefighter Steven King, who witnessed the attack on the Twin Towers, said the program has helped him. "I was walking around like a zombie; nothing seemed to matter anymore," King said on
"But after [the simulation therapy], I sleep better. I'm well on my way to getting back to the person I was pre-9/11."

In next week's study in California, Iraq war veterans will revisit traumatic scenes with the help of a combat simulation program developed by the University of Southern California in Los Angeles.

At the conference, a reporter navigated virtual Iraq with the help of Albert Rizzo, a co-creator of the simulation program.

Over sounds of heavy artillery and machine-gun fire at varying distances, Rizzo introduced sand storms and smoldering Humvees before the subject noticed an armed insurgent hiding in an ally. The joystick and goggles tracked the reporter's panicked reactions and uncertain eye movements, projecting them onto the computer screen for the therapists to follow.

The program was initially designed to train combat medics heading to Iraq.

Rizzo said initial data suggest that one out of six returning Iraq war veterans show some signs of post traumatic stress disorder.

Israeli Ministry of Defense officials who attended the conference expressed interest in using simulation therapy for Israeli soldiers as well.

The biggest risk in the new treatment approach is that patients could be traumatized again, said Israeli psychologist Eli Somer, who treats people suffering from post traumatic stress disorder. "By virtue of the disorder, people are hypervigilant, and we need to keep their environments as predictable as possible," he said.
Virtual reality may aid trauma victims
March 9, 2005

Researchers are offering US veterans of the Iraq war and Israeli survivors of Palestinian suicide bombings a new trauma treatment - revisiting painful scenes through virtual reality.

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One program will be tested at a naval hospital and army base in California next week on 80 US soldiers who returned from Iraq and have shown symptoms of post-traumatic stress disorder, including depression and anxiety.

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"I was walking around like a zombie; nothing seemed to matter anymore," King said on the video. "But after [the simulation therapy] I sleep better. I'm well on my way to getting back to the person I was pre-9/11."

Albert Rizzo, a co-creator of the simulation program, demonstrated at the conference how to navigate virtual Iraq.

Over the sounds of heavy artillery and machine-gun fire at varying distances, he introduced sandstorms and smouldering Humvees before an armed insurgent could be spotted hiding in an alley.
Bakterien unter dem Silikon


Krustentier mit Insekten-Nase


Heilung im Cyberspace

Virtual reality programs could help soldiers traumatized by war

Researchers at the University of Southern California are creating a virtual Iraq on their computer screens. The high-tech tool allows users to fly in a helicopter over a combat scene or walk the streets of Baghdad. The virtual reality program is designed to help soldiers suffering from post-traumatic stress disorder. A similar program is being designed for victims of the 9/11 terrorist attacks.

Overview:

- While the real Iraq is more than enough for most people to handle, there's a virtual Iraq lurking on the laptop of psychologist Skip Rizzo, a research scientist at the University of Southern California.
- This is no video game, nor is it a training device.
- Rizzo and colleagues are developing a psychological tool to treat post-traumatic stress disorder, or PTSD, by bringing soldiers back to the scenes that still haunt them.
- A similar simulation is in the works for victims of the World Trade Center attacks.
- PTSD treatment, the newest frontier in the intersection between virtual reality and mental health, is one of the hot topics this week at the 13th annual Medicine Meets Virtual Reality conference, which began Wednesday in Long Beach, California.
- "The driving vision is a holodeck," Rizzo said.
- Powerful computers are cheaper -- the necessary machines used to cost as much as $175,000 but now the Virtual Reality Medical Center in San Diego, one of about 10 private VR mental-health clinics in the United States, picks up its hardware at Fry's Electronics.
- At the San Diego clinic, graphics designers are developing a remarkably realistic virtual world based on digital photos and audio from San Diego International Airport.
- Patients afraid of flying will be able to take a virtual tour of the airport, from the drop-off area through the ticket counter, metal detectors and waiting areas.
- The simulation is so precise that users can enter restrooms, peruse magazines at the newsstand or wander around the food court; recordings will allow the virtual PA system to offer the requisite incomprehensible announcements.
- At $120 a session, patients sit in actual airplane seats and watch a simulation of a takeoff, accurate all the way down to announcements by flight attendants and pilots.

Source: http://www.wired.com/news/medtech/0,1286,66408,00.html?tw=wn_tophead_3
SAN DIEGO -- While the real Iraq is more than enough for most people to handle, there's a virtual Iraq lurking on the laptop of psychologist Skip Rizzo, a research scientist at the University of Southern California.

With a push of a button, special effects will appear -- a mosque's call to prayer, a sandstorm, the sounds of bullets or bombs. "We can put a person in a VR headset and have them walk down the streets of Baghdad," Rizzo said. "They can ride in a Humvee, fly in a helicopter over a battle scene or drive on a desert road."

This is no video game, nor is it a training device. Rizzo and colleagues are developing a psychological tool to treat post-traumatic stress disorder, or PTSD, by bringing soldiers back to the scenes that still haunt them. A similar simulation is in the works for victims of the World Trade Center attacks.

PTSD treatment, the newest frontier in the intersection between virtual reality and mental health, is one of the hot topics this week at the 13th annual Medicine Meets Virtual Reality conference, which began Wednesday in Long Beach, California. Rizzo and others will explore plans to expand virtual reality's role in mental health by adding more elements like touch and the ability to interact with simulations. "The driving vision is a holodeck," Rizzo said. "If you look at the holodeck, and all the things people do in Star Trek, that's what we'd like to be able to do."

For now, there's nothing close to a holodeck, and no one worries -- at least not yet -- that a malfunction will trap people in a fantasy world, as it did on the USS Enterprise. But psychological treatment by virtual reality has still undergone rapid changes over its decade of existence.

Powerful computers are cheaper -- the necessary machines used to cost as much as $175,000 but now the Virtual Reality Medical Center in San Diego, one of about 10 private VR mental-health clinics in the United States, picks up its hardware at Fry's Electronics. VR helmets -- which allow users to turn their heads and see things above, below and behind them in the 360-degree virtual world -- cost as little as a few thousand dollars. And perhaps most importantly, the graphics are more advanced, thanks to partnerships with video-game developers.

At the San Diego clinic, graphics designers are developing a remarkably realistic virtual world based on digital photos and audio from San Diego International Airport. Patients afraid of flying will be able to take a virtual tour of the airport, from the drop-off area through the ticket counter, metal detectors and waiting areas. The simulation is so precise that users can enter restrooms,
peruse magazines at the newsstand or wander around the food court; recordings will allow the virtual PA system to offer the requisite incomprehensible announcements.

The clinic already offers a simulation of a flight. At $120 a session, patients sit in actual airplane seats and watch a simulation of a takeoff, accurate all the way down to announcements by flight attendants and pilots. At takeoff, actual airplane audio -- engines revving, landing gear retracting -- is channeled into subwoofers below the seat, providing a dead-on simulation of what a passenger feels. Even the view outside the window is based on actual digital video from a flight.

"Exposure therapy" has long been a common treatment for phobias. "It's a gradual reversal of avoidance," said psychologist Hunter Hoffman, a researcher who studies VR at the University of Washington. "You start by having them hold their ground. A lot of phobics have mental misunderstandings about what would happen if they face the thing they're afraid of. A spider phobic, they may think they're going to have a heart attack -- they think if they don't leave the room, they'll go insane. They have these unrealistic theories about what will happen."

At the San Diego clinic, staff members monitor the breathing rate, pulse and perspiration of patients as they go through the simulations, allowing doctors to pinpoint the triggers for their panic.

A patient, for example, may freak out when a virtual transportation officer pulls her over for an extra security check. "If (they) have a panic attack when all of a sudden someone throws (them) a curve ball, we teach them how to deal with those unexpected things," said psychologist Brenda Wiederhold, the clinic's executive director.

Wiederhold said her clinic's success rate is 92 percent. That's not a cure rate, however. Success is defined as a patient reaching his or her goal, whether it's flying without the use of tranquilizers, or being able to fly for the first time with drugs on board.

Other simulations treat people with fears of heights and spiders. Patients scared of public speaking can stand behind a podium and give a speech in front of a virtual audience -- either a polite, quiet one or the "rude" audience whose members talk on cell phones and don't pay attention.

What's next? Researchers are still trying to figure out exactly how effective VR will be in the treatment of PTSD, and only two small studies have been published, Hoffman said. The good news -- if you can call it that -- is that troops who served in Iraq and World Trade Center victims are still in the early months or years of their conditions.

"Instead of having to treat these really difficult cases of Vietnam vets who are notoriously resistant, now you're treating people who have only had it for six months or two years," Hoffman said. "The prognosis for successful treatment is much higher."

Meanwhile, Wiederhold and VR researchers are hoping, not surprisingly, for more realism. In some simulations, people look less believable than characters from *The Sims.*
To help on that front, researchers hope to expand the field of view inside VR helmets, said the University of Washington's Hoffman. "The cheaper helmets are kind of like looking through a crack in the fence at your neighbors," he said. "You want the fence to disappear so you feel like you're standing in your neighbor's yard."

But mirroring every detail of life perfectly isn't as vital as it may seem, said Hoffman, who's developing simulations of cold to help burn patients tolerate painful treatments.

Ideally, "there's a blurring of the distinction between real and fantasy," he said. "It's real enough that it makes them anxious, but it's fake enough that they can tolerate it."

In many cases, imagination allows patients to fill in the blanks. In battlefield simulations, former soldiers sometimes hear bombs that aren't there.

An added bit of oomph -- bodily sensations like touch or even smell -- could help even more patients confront their fears. In San Diego, Wiederhold looks forward to technology that will allow her to customize scenarios easily for different patients, such as filling an airplane cabin with passengers to help treat those intimidated by crowds or providing more potential obstacles for patients wandering through the virtual airport.

For now, said USC's Rizzo, "we're still in a Stone Age on some of these things."
Virtual Reality Therapy: Treating PTSD and Providing Stress Inoculation

After commanding a transportation unit in Iraq, a National Guardsman returned home to California. He thought he was fine until the nightmares and night sweats started. He felt numb and detached from his family. When he drove to work, a bump in the asphalt triggered memories of improvised devices that exploded on Iraqi roadways. With the encouragement of his family, the Guardsman finally sought counseling. (Guthrie, 2005).

Meanwhile, a 24-year-old gunner still in Iraq became withdrawn, listless and disinterested in eating. He would lie awake, remembering how four of his friends, fellow soldiers, had their bodies torn apart by a bomb packed inside a taxi. He was referred to counseling for his “combat stress reaction” and returned to duty with his unit (Myers, 2003).

The issues are challenging: how do you reduce or avert the psychological wounds of war and prevent long-term, service-connected disabilities?

At the recent 13th annual Medicine Meets Virtual Reality Conference in Long Beach, California, researchers discussed the development of new technologies using virtual reality to treat soldiers returning from Iraq with post-traumatic stress disorder (PTSD) and to provide those being deployed there with stress inoculation training (SIT). Virtual reality integrates real-time computer graphics, body-tracking devices, visual displays, and other sensory input devices to immerse a participant in a computer-generated virtual environment that changes in a natural way with head and body motion (Rothbaum et al., 2001).

Albert “Skip” Rizzo, Ph.D., research scientist and research assistant professor at the Institute for Creative Technologies (ICT) at the University of Southern California, told conference attendees that ICT is creating an immersive virtual environment system for the treatment of Iraq War veterans diagnosed with combat-related PTSD.

We put tremendous resources into training our troops for combat, now “we need to make a strong case for dealing with the aftermath,” Rizzo said. “The military has an ethical responsibility to deal with PTSD.”

At press time, some 150,000 U.S. troops are in Iraq. Reports are emerging of some severe mental health problems among the troops. Between 8% and 10% of nearly 12,000 soldiers from the war on terror, mostly from Iraq, treated at the Landstuhl Regional Medical Center in Germany had “psychiatric or behavioral health issues,” according to hospital commander Col. Rhonda Cornum (United Press International, 2004). The hospital is the main transfer point and treatment center for those being medically evacuated from Iraq, Kuwait or Afghanistan.

A recent study focusing on mental health problems of U.S. military units involved in combat in Iraq and Afghanistan, Rizzo said, “gave his research a reason for being.” He explained that the study prepared by the department of psychiatry and behavioral sciences at Walter Reed Army Institute of Research (Hoge et al., 2004) suggests that one out of six Iraq War veterans is exhibiting mental health problems, a number close to PTSD-levels found among Vietnam veterans (15%).
According to the study, 17.1% of 882 Army soldiers and 15.6% of 813 Marines who served in Iraq met strict criteria for PTSD, major depression or generalized anxiety when they were screened three to four months after their return to the United States. By comparison, 11.2% of 1,958 Army soldiers who served in Afghanistan had mental health problems.

More specifically, rates of PTSD (12.2% to 12.9%) were significantly higher after combat duty in Iraq than before deployment (5%) as assessed using the 17-item National Center for PTSD Checklist of the Department of Veterans Affairs. The rates of PTSD were significantly associated with having been wounded or injured or having engaged in one or more firefight.

PTSD, Rizzo said, is caused by traumatic events that are outside the range of usual human experiences, such as military combat, violent personal attacks and terrorist attacks. According to the DSM-IV-TR, it is identified by clusters of symptoms such as cognitively re-experiencing the event (e.g., flashbacks, nightmares), persistent avoidance of things that remind the person of the trauma, numbing of general responsiveness and hyperarousal (e.g. the person is hypervigilant, has difficulty falling or staying asleep or is always on edge.).

A standard of nonpharmacological care for PTSD has been Imaginal Exposure Therapy. Such treatment, Rizzo said, typically involves the graded and repeated imaginal reliving of the traumatic event within the therapeutic setting. This approach is believed to provide a low-threat context where the patient can begin to therapeutically process the emotions that are relevant to the traumatic event as well as de-condition the learning cycle of the disorder via a habituation/extinction process. While the efficacy of imaginal exposure has been established in multiple studies with diverse trauma populations (Rothbaum et al., 2004), many patients have problems with it. Rizzo said.

“The problem with imaginal therapy is that sometimes people have a hard time imaging some of these events,” he said. “Also, avoidance and loss of memory of the events is part of the symptom package. So you are asking someone who has been traumatized in an extreme combat situation to start to remember it.”

Virtual Reality Exposure treatment (VRE) has been used to treat patients with PTSD with positive outcomes. In 1997, 20 years after Vietnam, researchers at Georgia Tech released the first version of “Virtual Vietnam VR” for use as a graduated exposure therapy treatment for PTSD with Vietnam veterans. In an open clinical trial, it was used to treat 10 Vietnam combat veterans who had DSM-IV PTSD. In eight to 16 sessions, the patients were exposed to two virtual environments: a virtual Huey helicopter flying over a virtual Vietnam and a clearing surrounded by jungle. All eight participants interviewed at the six-month follow-up reported reductions in PTSD symptoms ranging from 15% to 67% (Rothbaum et al., 2001).

Rizzo said his project involves the use of virtual assets that were initially built for a combat tactical simulation scenario entitled “Full Spectrum Command,” and later licensed to create the commercially available X-Box game, “Full Spectrum Warrior.”

Rizzo had seen a trailer for the game and was able to obtain access to the graphic assets of the game. With the help of programmer friends, he cobbled together a variety of graphic assets to create the prototype for the VRE application for Iraq war veterans. The software is being designed so clinical users can be teleported to highly realistic and emotionally evocative settings (e.g., city and rural village scenes, traffic checkpoint, building interiors and desert road) that most closely match the patient’s combat-related experiences.

Once the scenario is selected, different user perspectives can be taken, such as a soldier walking alone, being with a patrol, riding in a Humvee or helicopter.
We can also control time of day, and trigger stimuli, such as weapons fire, explosions, being shot at, seeing dead bodies or human remains, being wounded or injured, Rizzo said.

The prototype has a “Wizard of Oz” type clinical interface, Rizzo said. The interface enables the clinician to see what the patient is seeing and control “trigger” stimuli. It also allows for the monitoring of the patient’s physiological status. All of this is with the “goal of customizing the graduated exposure based on the client’s needs,” Rizzo added.

The VRE PTSD project, now in design testing, will not only help in the treatment of PTSD but also in its assessment, Rizzo said.

One of the findings of the combat duty study (Hoge et al., 2004) was that those who most needed mental health care were not receiving it out of fear of being stigmatized, prompting the study authors to call for PTSD screening.

Instead of having returning soldiers and Marines just complete a symptom checklist, Rizzo suggested that they could participate in an initial debriefing procedure that integrates the VR PTSD application with physiological recording. Past research has suggested differential physiological responses in people with PTSD, so the VR PTSD could be used to spot people who don’t self-report that they are having problems. Additionally, if indicators of substantive physiological reactivity are present during an initial VR exposure, the soldier could be referred for continued “debriefing care.”

**Stress Inoculation**

Stress inoculation training is another area being explored for helping troops before they are deployed to Iraq. Brenda Wiederhold, Ph.D., and her husband, Mark Wiederhold, M.D., Ph.D., of the Virtual Reality Medical Center in California are conducting “stress inoculation training” research under a contract with the Pentagon’s Defense Advanced Research Projects Agency. They are developing a hybrid approach combining virtual reality simulations with live training, while monitoring the physiology of warriors in tactical situations. By analyzing tactical decision-making under stress, the Wiederholds hope to develop techniques to help trainees control fear and anxiety; in effect, to inoculate them against stress.

Mark Wiederhold told attendees at the Medicine Meets VR sessions that they have trained several Marine Corps battalions with stress inoculation techniques involving virtual reality games and live experiences, and those troops are now in Iraq and Afghanistan.

“We will be able to compare rates of PTSD among troops that received stress training versus groups that have not,” he said.

“The whole idea of using VR for therapy translates very effectively for using VR for training the military, said Mark Wiederhold.

We’re looking at training combat medics using a simple video game” created by Legacy Interactive, Wiederhold said. [Dr. Wiederhold, is the game being marketed yet and if so, what is the name?]

“Despite using a single video game, we were able to get physiological arousal with significant increases in both respiration and heart rate when they were playing it. The game essentially requires them to take care of these wounded individuals in the field. It then provides divided attention tasks where they have to break away from caring for the wounded and shoot at enemies that are shooting at them,” he said.

The trainees are then tested in the real world to determine if the skills learned in simulated environments do indeed generalize to the real world.

Beyond combat, other speakers at the conference described the use of virtual reality exposure to treat PTSD related to terrorism and accidents.
Hunter Hoffman, Ph.D., director of the Virtual Reality Analgesia Research Center at the University of Washington’s Human Interface Technology Laboratory in Seattle, described his work with JoAnn Difede, Ph.D., associate professor and director of the Program for Anxiety and Traumatic Stress Studies in the department of psychiatry at Weill Medical College of Cornell University, in the development of VRE treatment for patients suffering from PTSD as a result of Sept. 11 terrorist attacks. Hoffman also is collaborating with a team of researchers led by PTSD therapist Patrice L. (Tamar) Weiss of Haifa University of Israel and Azucena Garcia-Palacios of Jaume I University in Spain to create a virtual-reality treatment for survivors and witnesses of suicide bombings who develop PTSD.

Brenda Wiederhold, discussed how VRE is being used for automobile accident victims. For individuals experiencing PTSD after motor vehicle accidents or those who fear driving or driving on the freeways, because of their panic and agoraphobia, Wiederhold said her team provides virtual reality graded exposure therapy. It is conducted in the safety of the office and allows the clients to slowly build their skills and confidence without exposing themselves or others to unnecessary dangers.

We have multiple screen displays, she said, as well as head-mounts. Clients sit in automobile seats with subwoofer speakers incorporated into their base that produce vibration simulating motion. The displays can be used is simulate various driving conditions such as night-time, daytime, snow and rain.

Other Applications
Brenda Wiederhold also described other applications of VRE for anxiety disorders, explaining that at VR Medical Center’s San Diego research facility, they provide treatment for panic disorder, agoraphobia, social phobia and specific phobias such as fear of flying, fear of heights, claustrophobia, fear of thunderstorms and fear of public speaking.

One of the research studies described by Brenda Wiederhold was a new treatment protocol for panic disorder and agoraphobia, named Experiential-Cognitive Therapy (ECT) that integrates the use of virtual reality in a multicomponent Cognitive-Behavioral Therapy strategy. She reported on a controlled study involving 12 patients, who were divided into three groups: an ECT group who experienced the Cognitive-Behavioral Therapy plus virtual reality-assisted treatment (eight sessions), a group that experienced the traditional Cognitive-Behavioral approach (12 sessions) and a waiting-list control group.

When VR was used as an adjunct to traditional Cognitive-Behavioral Therapy, Wiederhold said, “We found that panic attack frequency was reduced after eight sessions, that the fear went down post-treatment, and that depression, which wasn’t specifically targeted, also went down after treatment” (Vincelli et al., 2003).

At the VR conference, Brenda Wiederhold received the 11th Annual Satava Award in recognition of her continuous effort to further the application of advanced technologies and virtual reality for patient care. This is the first time that the award has been presented for work in the mental health care field and only the second time that it has been awarded to a female researcher.

Other mental health applications for VR described at the conference included the diagnosis of schizophrenia, the treatment of eating disorders, rehabilitation and pain distraction.

Anna Sorkin, Ph.D. (Cand), affiliated with the Interdisciplinary Center for Neural Computation at the Hebrew University of Jerusalem, described a new tool for the diagnosis of schizophrenia, which is essentially a computer game based on virtual reality technology, including real-time interactions and multimodal stimulations. She described a study in which 39
patients with schizophrenia and 21 healthy controls played a computer game, requiring navigation of a virtual maze with rooms that included a number of different doors, identified by a few features. Upon completion, each participant was assigned a performance profile, including various error scores, response time, navigation ability and strategy. The researchers found that patients with schizophrenia could be reliably separated from controls based on their performance profile in the virtual reality maze.

Giuseppe Riva, Ph.D., associate professor of communication psychology at the Catholic University of Milan, Italy and a researcher with the Applied Technology for Neuro-Psychology Laboratory, described studies involving the use of Integrated Experiential Therapy (IET) for obesity, which combines cognitive-behavioral therapy and virtual reality.

To explore the hypothesis that IET could improve the efficacy of an inpatient obesity treatment, Riva and his colleagues compared its effects with that of nutritional (NT) and Cognitive-Behavioral Therapy (CBT) treatments and a waiting-list control group. The randomized trial involved 211 obese females with a body mass index of greater than 35. After a six-month follow-up, both IET and CBT produced a better weight loss than NT. But IED was superior to CBT and NT in body image satisfaction and self-efficacy.

Walter Greenleaf, Ph.D., president of Greenleaf Medical Systems, a Palo Alto, California company, described applications for computer-assisted rehabilitation. He explained that in most rehabilitation models the patient is seen periodically by a therapist in a clinic, but most of the rehabilitation is done outside the clinic. During a two-month course of recovery, for example, the patient can risk losing strength unless compliant with doing the rehabilitation exercises often at home.

“There is a wide variety in treatment results from otherwise similar injuries, because of the differences in patient compliance,” Greenleaf added.

To increase patient compliance, Greenleaf Medical is working with Stanford University, among others, to create a telerehabilitation system. Patients will be able to look at video demonstration on how to do recovery exercises. Additionally, a web-based interface allows therapists to remotely monitor their patients’ progress at home.

Hoffman described his work with David Patterson, Ph.D., a pain expert at the University of Washington’s School of Medicine, and others in using immersive virtual reality as a nonpharmacological analgesic for severe pain, particularly that experienced by burn patients undergoing wound care (Hoffman, 2004; Hoffman et al., 2004).

No matter what the VR application, Brenda Wiederhold said, there are barriers to be overcome, including cost, the lack of standardization in equipment and resistance from mental health professionals.

We need to educate the mental health professional that we are not trying to do away with the therapeutic alliance, she said, but rather to add to that process.

References
Video game used to help war-stress problems

By Chris Marshall
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A team of nine scientists at the USC Institute for Creative Technologies is converting an Xbox game into a treatment for soldiers returning from Iraq who suffer from post-traumatic stress disorder.

The game, "Full Spectrum Warrior," was designed by scientists to train soldiers for combat in urban areas, helping them prepare for war from the comfort of a couch.

"I saw a clip for 'FSW' and noticed that essentially it's a giant virtual reality environment," said Albert Rizzo, a research scientist at the Centers for Creative Technologies who helped lead the project. "It struck me that, wow, these are great graphic assets that could be translated into therapy."

"FSW" was designed in tandem with the Army's Infantry School at Fort Benning, Ga., as part of a $100 million, five-year contract awarded by the Army in November.

The Office of Naval Research funded the therapy project with the significantly smaller sum of $540,000 for the first year.

By taking the virtual environments created for the game, researchers are creating a method of slowly exposing soldiers to the stimuli that created the stress.

In a psychological study used by the scientists, events such as killing an enemy, seeing a
fellow soldier die or receiving enemy rocket or mortar fire are some of the events shown to create post-traumatic stress.

Given the high rates of occurrence, many soldiers exhibit symptoms of deteriorating mental health after serving in combat. Almost two out of every 10 soldiers who return from fighting in Iraq show symptoms of anxiety, depression or PTSD, according to a New England Journal of Medicine study from July.

Many more might go unreported, as soldiers might be reluctant to admit a problem for fear of ruining a military career, Rizzo said.

With the help of a trained psychologist, soldiers will be gradually re-exposed to the events that caused their anxiety. This is similar to the treatment for other anxieties, where a patient is exposed to what they fear in a controlled environment.

"We're trying to make therapy less stigmatizing," Rizzo said. "You see this with people who are afraid of flying. They won't go to traditional therapy, but are willing to go to virtual reality training."

The USC team has been working with Virtually Better, an Atlanta group that developed a "Virtual Vietnam" application to treat PTSD in veterans from that war.

Computer scientist Jarrell Pair, who also helped lead the project, worked at Georgia Tech in 1997 on that project and provided a great amount of experience in the development of the Iraq virtual environment.

The researchers see the difference between the two applications as one of more advanced technology and the millions of dollars it took to create the virtual Iraq environment.

Of the total $540,000 budget, only $154,000 went to the ICT researchers who were responsible for creating the virtual environment. The bulk of the money went to the clinical trials at the Naval Medical Center and Camp Pendleton in San Diego, among other military bases.

Rizzo hopes the Army will come on board with funds to further develop the project.

"For young soldiers who grew up on video games, this should be a good fit," he said.
Evaluating Virtual Reality Therapy for Treating Acute Post Traumatic Stress Disorder

Arlington, Va.—The Office of Naval Research (ONR) is funding three projects to evaluate virtual reality therapy for treatment of acute post traumatic stress disorder (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.

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.

James Spira of the Naval Medical Center San Diego will work with Ken Graap of Virtually Better, Inc. (Atlanta) and Dr. Albert (Skip) Rizzo 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 is 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 examine the effectiveness of using a virtual reality based cognitive behavioral treatment for U.S. warfighters suffering from acute PTSD.

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The Office of Naval Research (ONR) manages science and technology research for the Navy and Marine Corps. ONR sponsors basic and applied research in oceanography, advanced materials, sensors, robotics, biomedical science and technology, electronics, surveillance, mathematics, manufacturing technology, information science, advanced combat systems, and technologies for ships, submarines, aircraft, and ground vehicles—and more.

For information about ONR's programs, go to http://www.onr.navy.mil.
Returning US troops fight combat stress

BEIJING, April 4 -- With the war in Iraq entering third year, the US military is fighting a growing problem. One recent study by the New England Journal of Medicine found that nearly 17 percent returning soldiers were suffering from some form of post-traumatic stress disorder.

At Camp Pendleton in California, US Marines say that coming home is in fact a difficult readjustment.

Marines Pvt. Nate Barbosa said, "Coming back, there is some adjustments. It takes an average of anywhere from 30 days to 6 months to adjust mentally, to not get jumpy everytime you hear loud noises, things like that."

"There's no guarantee, you could have the easiest job, working battalion, doing paperwork all day," said US Marines Pvt. Jason Cohea. "One mortar, just one mistake of a mortar round by the enemy and you're not there anymore."

To help deal with combat stress, a number of military scientists are betting on a new high-tech treatment. It's a program that uses virtual reality, literally taking soldiers back to the front lines.

Psychologist James Spira said: "The virtual reality environment is clearly not the same thing as being there and we don't want it to be the same as being there. We want it to be semi-realistic. We want it to be enough to trigger the thoughts and feelings so they can control those."

Funding for the virtual-reality program is said to be around $4 million dollars for the next three years. It's one of several options the US military is looking at, as they take a pro-active approach to a problem they vow won't be a repeat of what took place after Vietnam.

VR Will Treat Stress in Iraq War Vets

USC scientists who developed virtual reality technology to train soldiers are using the same tools to help returning troops cope with traumatic events.

By Usha Sutliff

The virtual-reality PTSD assessment and treatment system has adapted assets from virtual scenarios originally developed for the game Full Spectrum Warrior (Xbox), in combination with newly created next-generation graphic content developed at the ICT.

Scientists at the USC Institute for Creative Technologies are converting content from a game designed to teach soldiers about leadership and tactics into a therapy tool to treat Post-Traumatic Stress Disorder in soldiers returning from war in Iraq.

The project is headed by ICT Research Scientists Albert "Skip" Rizzo and Jarrell Pair and is funded by the Office of Naval Research.

The virtual-reality PTSD assessment and treatment system has adapted assets from virtual scenarios originally developed for the game Full Spectrum Warrior (Xbox), in combination with newly created next-generation graphic content developed at the ICT.

The first prototype from this effort is now in place with collaborators at Camp Pendleton and at the San Diego Naval Hospital, who will use it to treat PTSD in Iraq War veterans with symptoms ranging from flashbacks to depression.

The project is part of a three-year clinical trial that partners USC with Virtually Better, the Atlanta-based group that had previously developed the Virtual Vietnam PTSD application in 1997. Plans are also in place to have a version of the application set up in Iraq to solicit feedback on its features from actual soldiers on the ground via a partnership with Ft. Lewis Army psychologists Col. Greg Gahm and Capt. Greg Reger.

"We're taking something that was already developed at USC and retooling it for a different purpose," said Rizzo, also a research assistant professor in the USC Leonard Davis School of Gerontology. "It just makes sense to see the application go full circle like this."

The commercially successful Full Spectrum Warrior is a combat simulator developed in conjunction with personnel from the Army's Infantry School at Ft. Benning, Ga. The game, billed as "the authentic Army experience," puts the player in an urban fighting environment.
The new project will adapt and add to those virtual environments, transform them into combat areas in the Middle East and, under the watchful eye of a trained
psychologist, gradually expose the soldiers to stimuli that resemble the traumatic events that created their disorder.

The most efficacious approach to treating anxiety disorders such as PTSD has been cognitive behavioral therapy, Rizzo said, where the patient is gradually
exposed to what he or she fears. This is the classic approach used to treat common anxiety disorders such as fear of heights, fear of flying or fear of public
speaking.

But post-traumatic stress disorder is both more complicated and more generalized.

"With PTSD, you have a more intense anxiety response based on traumatic events that are typically outside the sphere of normal human experience," he said.

The challenge comes in exposing the soldiers to stimuli that bring them back to a traumatic event – such as seeing someone getting shot or shooting someone –
while not traumatizing them all over again.

One way to address this challenge is to gradually expose the patient to stimuli that resemble the traumatizing event, but within the safety of a supportive clinical
setting. In this project, the clinician will have control over every aspect of the virtual-reality environment, changing scenarios, sounds, weather and the intensity of
the experience.

One goal of the treatment will be to create an emotional response in the patient that he or she can then work through with the therapist in a supportive
environment.

"Our aim here is not to re-traumatize people, but rather to re-expose them to relevant traumatic events in a graduated way that they can handle," Rizzo said.

"You want to help people manage their emotional responses in a way that makes them more functional in their day-to-day lives and relationships.

"For example, when a car backfires, you want to help a patient get to the point where he doesn't have a flashback of a gun going off," Rizzo said.

This is not the first time patients have been immersed in a virtual environment to help them cope with traumatic events. The approach was first used in 1997, to
treat Vietnam veterans with PTSD and later to treat survivors – such as firefighters – of the 2001 World Trade Center attacks. VR is also being tested as a
treatment for PTSD in survivors of terrorist bus bombings in Israel.

The difference may be the highly advanced technology now being used.

Because of the groundwork laid by the USC developers of Full Spectrum Warrior, Iraq War vets will be stepping into a virtual world that took millions of dollars to
create. Due to the urgent need for such innovative PTSD treatment tools – and since the ICT scientists were able to recycle many of these assets – the prototype
version currently at Camp Pendleton will be the first of its kind to be tested with returning soldiers from the Iraq War. The testing will occur in collaboration with
Brenda Wiederhold from the Virtual Reality Medical Center.

Eventually, Rizzo said, he envisions a scenario in which every returning soldier, sailor, airman and Marine is screened for PTSD using this new tool.

"It's a nice merger between game development, computer graphics, psychology and all of the engineering technology that goes into creating virtual environments,"
Rizzo said.

"Our goal," he said, "is to help military personnel begin to manage the difficult emotions that are sometimes the byproduct of combat-related experiences. And with
recent reports coming out suggesting Vietnam-levels of PTSD in returning Iraq War soldiers, we are working on this project with great urgency."

The ICT partnered with the U.S. Army in 1999 to create virtual reality tools that would train troops to be better leaders and decision makers in the field. In
November 2004, the Army extended its previous contract by five years and awarded ICT $100 million – the largest research contract ever received by USC.

The union has proven to be a successful one, with ICT standing squarely at the intersection of the U.S. military's desire for more sophisticated training tools and
the multibillion gaming industry's desire for more realistic combat scenarios.

It has been two years since the U.S. troops who spearheaded the invasion of Iraq in 2003 first entered Baghdad. As urban warfare in Iraq enters its third year, the U.S. military is fighting a growing problem -- what to do with soldiers who are mentally scarred by combat. Scientists in the United States are working on a new kind of high-tech treatment. It is a “virtual reality” computer program that recreates front-line experiences -- forcing veterans to confront their war-zone memories in a controlled environment.

Prague, 5 April 2005 (RFE/RL) -- U.S. Marines returning from combat in Iraq get a heroes’ welcome at their home base of Camp Pendleton in southern California.

Some of these soldiers had fought their way from Al-Basrah to Baghdad two years ago. Others took part in the urban battle at Al-Fallujah in November.

Now they are undergoing the transition back to domestic life -- hugging their families, paying electricity bills on time, and going to backyard parties in their neighborhoods.

A recent study published in the “New England Journal of Medicine” found that nearly 17 percent of all U.S. soldiers who took part in the 2003 invasion of Iraq report combat-related mental illnesses.

But many are still haunted by the memories of their combat experience.

Many U.S. troops agree that one of their most disturbing memories is of dogs eating human corpses. Others say they will never forget the smell, the suffering of women and children, and the loss of their own friends in battle.

Marine Private Nate Barbosa says returning home has been difficult:

"Coming back, there are some adjustments," he says. "It takes anywhere from 30 days to six months to adjust mentally [just to] not get jumpy every time you hear a loud noise. Things like that."

A recent study published in the “New England Journal of Medicine” found that nearly 17 percent of all U.S. soldiers who took part in the 2003 invasion of Iraq report combat-related mental illnesses. There has been a notable increase in the number of broken marriages, car accidents, fights, and alcohol or drug abuse.
Like many returning soldiers, Marine Private Thomas Barnard admits sometimes feeling uncontrollable bouts of anger:

"I had a problem with my temper when I first got back," he says.

To help deal with combat stress, U.S. military scientists are working on a new form of treatment that uses "virtual reality" technology. Veterans wear video goggles and earphones to immerse themselves in a combat simulator. They control what they see by turning their head and acting out what they would do in a real combat situation.

To take the soldiers back to the frontlines, the earphones blast the sounds of U.S. combat helicopters flying overhead along with the sound of mortar explosions and incoming sniper fire.

In one section of the simulation, a white pickup truck with Iraqi fighters bursts into flames, while another pickup truck charges straight towards the veteran wearing the goggles.

Jesse Patacsil spent seven months in Iraq and is among a group of soldiers testing the system at the Naval Medical Center in San Diego:

"When I don [eds. wear] the goggles and I hear the explosions, basically, it brings me back to like, 'Where's the casualty?' That's basically what happened, what I had in mind. That's why I'm looking around and running around and walking towards the action, it's to make sure that there is anyone that needs help. That's basically what my feelings were when I was over there," Patacsil says.

As Patacsil goes through the virtual-combat experience, therapists use biofeedback sensors, heartbeat monitors, and other equipment to try to pinpoint the events that raise his anxiety.

Doctor James Spira, a staff psychologist at the Naval Medical Center, says such information can help veterans gain better mental control over situations that cause post-traumatic stress disorder:

"The virtual reality environment is clearly not the same thing as being there. And we don't want it to be the same as being there. We want it to be semi-realistic. We want it to be enough to trigger the thoughts and feelings so they can control those," says Spira.

During the next few months, the military's virtual-reality program will undergo fine tuning. Part of that will be done at the University of Southern California's Institute for Creative Technologies.

Jarrell Pair, a software designer at the Los Angeles-based research center, notes that work is now underway to improve the simulation of sights, sounds, and even smells:

"We do not want to re-traumatize the patient," Pair says. "And that's one nice thing about using interactive virtual-reality technologies. We can tightly control that environment. We can change the volume of the sound, the types of sounds. We can change the time of day. We can change the city from a being a nice peaceful area to something that may be violent. Or anything in between. We hope to really get to the point where we can recreate particular instances that traumatized the patient -- and reintroduce those to allow the person to try and figure out new ways to deal with them."

Skip Rizzo is an assistant professor at the University of Southern California who is involved with the virtual-reality study:

"I'm hoping that this effort will be the start of a larger effort and recognition that if you're going to put people in harm's way and spend a lot of money and resources on training them to be effective in the battlefield, that a good amount of care and attention is put into helping these folks out when they come back," he says.

Funding for the virtual-reality program during the next three years is reportedly about four million dollars.

It is just one of several options the U.S. military is considering as a pro-active approach to a problem seen after the Vietnam conflict -- the sight of thousands of dysfunctional veterans alienated and alone.
Virtual Help for War Stress

The Office of Navy Research wants to treat traumatized soldiers with virtual reality.

April 7, 2005

The Pentagon has long used video games and computer simulations to ready fresh recruits for battle. Now it’s looking at virtual reality as a therapy tool for ex-soldiers traumatized by war.

The Office of Naval Research (ONR) is spending $4 million over the next three years to investigate how therapists can use virtual reality to treat veterans suffering from acute post-traumatic stress disorder (PTSD).

New wars are creating a need for the new tools. A study in the *New England Journal of Medicine* last July found that between 15 and 17 percent of soldiers who served in Iraq suffered from major depression, anxiety, or PTSD. Only 11 percent of soldiers in Afghanistan experienced the same symptoms. There are now around 125,000 troops in Iraq and Afghanistan.

The new research announced last week is aimed at treating a new crop of soldiers. Commander Russell Shilling, the program’s manager, said he hopes that the therapy’s video game qualities will “resonate well with the current generation of warfighters.” The goal of the Navy’s research is to look at ways that traumatic wartime events can be treated before PTSD sets in and becomes a chronic condition.

The research will build on already existing virtual reality remedies. Virtually Better, a company in Atlanta that crafts cyber environments to help phobics overcome fears of flying, public speaking, heights, and storms, will simulate the sights, sounds, and smells of combat in Iraq and Afghanistan.

Virtually Better’s digital recreations will be merged into a therapy tool based on the U.S. Army’s *Full-Spectrum Warrior* video simulator, which trains soldiers in urban fighting. Albert Rizzo, a professor at the University of Southern California’s Institute for Creative Technologies, will adapt *Full-Spectrum Warrior* into a therapy device to treat the after-effects of fighting.

The Veterans Administration currently uses a more primitive form of virtual reality to help therapists treat Vietnam War vets suffering from PTSD. In a step toward greater realism, the ONR research will use smell to take soldiers back to their painful memories more completely.

Virtually Better is interviewing soldiers who served in Iraq and Afghanistan to learn what smells spark recollections of the war. The answers are not surprising: smoke, burned rubber, diesel smoke, and cooking food.

Loaded into cartridges and released by a device connected by a USB port to a computer, the scents will be triggered as clients navigate through the virtual environment.
PTSD is classified as an anxiety disorder. The goal of virtual reality therapy is to break a cycle of avoidance by repeated confrontations with the past. Ken Graap, the president and CEO of Virtually Better, said that virtual reality treatments have reduced 25 to 30 percent of symptoms in Vietnam veterans.