

# It's Not All in Your Head

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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."