VIRTUAL INTERACTIVE COURTROOM ENVIRONMENTS ARE HERE
WILL YOUR AGENCY BE READY?

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The Command College Futures Study Project is a FUTURES study of a particular emerging issue of relevance to law enforcement. Its purpose is NOT to predict the future; rather, to project a variety of possible scenarios useful for strategic planning in anticipation of the emerging landscape facing policing organizations.

This journal article was created using the futures forecasting process of Command College and its outcomes. Defining the future differs from analyzing the past, because it has not yet happened. In this article, methodologies have been used to discern useful alternatives to enhance the success of planners and leaders in their response to a range of possible future environments.

Managing the future means influencing it—creating, constraining and adapting to emerging trends and events in a way that optimizes the opportunities and minimizes the threats of relevance to the profession.

The views and conclusions expressed in the Command College Futures Project and journal article are those of the author, and are not necessarily those of the CA Commission on Peace Officer Standards and Training (POST).
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The year is 2020. Senior Investigator Ellen Ripley, a member of the San-Huntington-Ojai (SHO) Police Services is about to testify in a criminal case involving a terrorist group whose plans to attack the 4th of July parade in Huntington Beach were thwarted last year. Courtroom testimony is nothing new to Ripley. She has testified hundreds of times, all from the comfort of her home via the Virtual Interactive Courtroom Environment (VICE) technology provided by her Department. VICE technology has become standard issue to all SHO Investigative personnel, and with the price of gasoline at $20 a gallon, will soon be issued to all officers in the Department.

The VICE in Ripley’s home is an advanced and smaller version of a system developed more than 30 years ago by the U.S. Military. The system consists of a computer connected to a raised base. Mounted on the base are 50 small carbon fiber rollers gliding upon a layer of nano-graphite. On top of the base stands a hollow circular ball that is seven feet in diameter. The exterior of the ball is coated with a nanocrystal sheath, which allows the movement of the ball on the rollers to be tracked by the computer module attached to the platform. The interior of the ball is accessed through a hatch, and the interior walls use the newest “smart wall” technology consisting of tiny audiophotonic crystal projector-recorders capable of producing a 3D image and tracking every move of the occupant. The image recorded of the user and their movements is simultaneously projected into the virtual environment they are occupying.

More than 750 miles away, in Pelican Bay, California’s “supermax” prison, the two defendants in Ripley’s case have already entered a modified version of the VICE...
system, and are seated next to their attorneys at the defense table in the virtual courtroom. As Ripley entered the VICE system, she was thankful she had the newest version (older ones required her to wear a head mounted display, which occasionally caused virtually-induced motion sickness). Ripley’s system projected a 3D 360 degree image on the “smart-walls” that surrounded her. Once inside, Ripley retrieved two bracelets from a recessed panel and placed them on her wrists. The bracelets, the newest version of Cyberglove® (Immersion), allowed Ripley to handle evidence and other objects in the virtual courtroom. Ripley activated the VICE system using a touch panel embedded in the wall, and was instantly projected into the virtual courtroom of Judge Harrison.

Although Ripley had tried to prepare herself, her heart began to race when she locked eyes with the defendants seated with their lawyers. Once she regained her composure, Ripley smiled at the Bailiff who she had known, virtually, for several years, and took her seat next the District Attorney. As they waited for Judge Harrison to arrive, Ripley thought about how strange the VICE system had felt when she first used it several years ago. Now, the technology was so commonplace it seemed foolish to believe people actually wasted the time and fuel necessary to travel great distances to see the same people in the flesh.

Is this concept farfetched, the product of the vivid imagination of science fiction writers? The answer to that question is; perhaps. However, most of the technology necessary to implement Virtual Courtrooms is not only available, but also reasonably affordable. The Virtual Interactive Courtroom Environment of tomorrow is almost here. The real questions are; is the American public ready to accept virtual trials, and will your agency be ready when they do?
The V.I.C.E System

To discuss a Virtual Interactive Courtroom Environment (V.I.C.E.) system, it is necessary to provide a vision of the system and how it would operate.

The VICE technology described above is an advanced version of a system developed as part of a $40 million, six-year program by the Office of Naval Research. Known as the “Virtushpere,” the system consists of a computer, a nine-foot hollow plastic sphere, and a base platform with 26 wheels. The sphere rests upon the base platform that allows the ball to rotate in place, and the computer senses and interprets the movement. The user enters the ball wearing virtual reality goggles connected to a computer via a wireless connection. The virtual reality goggles display a 3D image representing the simulated environment the user is occupying. As the user moves about inside, the ball rotates upon the wheels and the movement of the ball is captured by the computer. This movement along with the movement of the user’s body is interpreted by the computer software, which in turn syncs the movements with the virtual environment displayed in the VR goggles. (Scientific American Magazine January 2006)

The VICE system in Ripley’s home of the near future incorporates the basic components of “Virtusphere;” a computer, broadband connection, wireless connection, base, and ball or sphere. Additions to the basic components of Virtusphere come from technology that either currently exists or is in development, taking into consideration advancements in their respective fields. These include a “smart-wall” capable of producing a 3D image, and the dataglove or “Cyberglove®” that allows the user to manipulate objects within the virtual environment. Although the concept of conducting a
criminal trial within a virtual environment seems far-fetched, the truth is the concept is no more unbelievable today than walking on the moon was in the 1950’s.

To discuss the prospect of incorporating virtual reality into a courtroom environment, it is useful to define what we mean by “virtual reality”, and to briefly examine the history of virtual systems that may lead us to the courtroom of the future.

**History of Virtual Reality**

Mankind has been altering reality, primarily through the use of mind altering drugs for thousands of years. The history of virtual reality, as we have come to know the term, is interwoven with the history and development of modern day computers. The actual term “virtual reality” has been credited to a 1982 science fiction novel, “The Judas Mandala”; however credit for the popularization of the term is widely given to Jaron Lanier, one of the early pioneers in the field of virtual reality, and founder of Virtual Programming Languages (VPL) Research Company.

First attempts to create an electronically induced altered reality can be traced back to the early 1960’s. One of the most important developments came in 1962, when cinematographer and part-time inventor Morton Helig patented “Sensorama,” an arcade game that used motion, sound, and odors to convince users they were riding a motorcycle on a city street. (Retro Future) Unfortunately, Helig’s invention pre-dated digital computing and failed as a business venture. Other concepts introduced in the same decade, though, have become a part of the technology of today.

Credit for conceiving of the first virtual reality system utilizing a Head Mounted Display (HMD) has been given to Ivan Sutherland, who in a 1965 paper entitled The Ultimate Display, described a system that would; “make a (virtual) world in the window
look real, sound real, feel real and respond realistically to the viewer’s actions.” (Mazuryk and Gervautz. Research into virtual systems continued, and in 1977 the Massachusetts Institute of Technology (MIT) introduced the “Aspen Movie Map,” which allowed the user to wander through a virtual simulation of the streets in Aspen, Colorado. (McGraw-Hill Encyclopedia of Science and Technology) Since that time, the development and definitions of virtual environments have matured substantially.

**Defining Virtual Reality**

Virtual Reality encompasses a broad range of topics and is synonymous with a number of other terms which include; Virtual Environments, Immersive Environments, Augmented Reality, and Artificial Reality. Merriam-Webster Online Dictionary defines Virtual Reality as “an artificial environment which is experienced through sensory stimuli (as sights and sounds) provided by a computer, and in which one's actions partially determine what happens in the environment; also: the technology used to create or access a virtual reality” (Mirriam-Webster Online Dictionary, 1987). Sci-Tech Encyclopedia defines virtual reality as; “A form of human-computer interaction in which a real or imaginary environment is simulated and users interact with and manipulate that world. Users travel within the simulated world by moving toward where they want to be, and interact with things in that world by grasping and manipulating simulated objects.” Sci-Tech goes on to say, “In the most successful virtual environments, users feel that they are truly present in the simulated world and that their experience in the virtual world matches what they would experience in the environment being simulated. This sensation is referred to as engagement, immersion, or presence, and it is this quality that
distinguishes virtual reality from other forms of human-computer interaction.” (McGraw-Hill Encyclopedia of Science and Technology)

According to Jonathan Steuer, Ph.d, virtual environments allow a user to become completely immersed within the virtual world, and give the user the ability to interact with the environment in meaningful ways. Steuer calls this telepresence, and defines it as “the extent to which one feels present in the mediated environment, rather than in the immediate physical environment.” (Jonathan Steuer, Defining Virtual Reality (1993)

Arguably, one of the most influential groups involved in the development of Virtual Reality systems has been the United States Military.

In the early 1960’s, the U. S. military began looking at flight simulators as a way to provide initial training for pilots in a cost efficient and safe manner. These early systems, when coupled with video displays provided visual and sensory feedback. In the early 1970’s, advancements in digital computers led to the development of virtual simulators operating in real time. Today, the military uses virtual reality technology to plan battles, train the modern Full Spectrum Warrior (FSW), and treat anxiety disorders.

In a project sponsored by the U.S. Army Research, Development and Engineering Command (RDECOM), the University of Southern California’s Institute for Creative Technologies (USC-ICT), is conducting two ongoing virtual reality research projects addressing emotional issues relevant to the military. These issues are; Sensory Environments Evaluation (SEE) project, which looks at basic factors underlying emotion and training, and the Full Spectrum Warrior Post Traumatic Stress Disorder (PTSD) Therapeutic Virtual Environment, which uses already existing FSW tactical virtual reality
environments to treat soldiers with PTSD. (Rizzo, Morie, Williams, Pair, Buckwalter, ICT-USC)

Improvements and refinements in computer graphics gave way to the incorporation of computer graphics, or Computer Graphic Imagery (CGI) into the movie and entertainment industries. The first major motion picture to extensively utilize scenes generated by a computer was Star Wars, which was released by 20th Century Fox on May 25, 1977. Once the entertainment industry embraced CGI, advancements in graphic abilities expanded exponentially. The ability to create virtual worlds through CGI was at hand; however, movies did not allow the viewer to participate in the environment and lacked the sensory feedback provided by the military flight simulators. The need for this capacity propelled research to create a “high touch” experience in VR.

Systems that provide force feedback and touch interaction are known as haptic (relating to touch) systems. One of the first developments in haptic systems was the development of the dataglove, a computer interface, that when worn, detected hand movements. Although the dataglove was developed to produce music via a music synthesizer, NASA Ames Research Center was one of the first to experiment with the device as a means of interacting with objects in a virtual environment. (National Center for Supercomputing Applications (NCSA), 1995)

State of Virtual Reality

Today’s Virtual Reality systems have the ability to provide stimulation to three of the five human senses, and systems, such as Virtusphere, describe earlier, easily provide stimulation to the sense of touch, sight, and sound. Stimulating the sense of smell and
taste has proven more difficult. In a 1999 paper entitled “Olfaction for Virtual Reality”, Martin Zybura and Gunnar A. Eskeland, students at the University of Washington, discussed the importance of ambient odors in the simulation of physical environments (Martin Zybura, 1999). Research in using odors to aid in simulating a virtual world is ongoing, and recent research has suggested that the inclusion of odors may greatly enhance the effectiveness of virtual reality in treating Post Traumatic Stress Disorder in Iraqi war veterans. (Gever, 2008) Although the use of odors in a virtual environment can be realistically accomplished, the development of each odor requires costly research, and the machine itself is expensive. (McGraw-Hill Encyclopedia of Science and Technology)

In the July 2003 issue of New Scientist magazine, Hiro Iwata of the University of Tsukuba in Japan reported that he and his colleagues have crossed the “last frontier of virtual reality” and now can simulate the complex experiences of taste, which combines the feel of food with the chemical and auditory cues associated with the item being sampled. (New Scientist July 31, 2003)

The current state of virtual reality and its ability to produce a realistic and immersive experience leads us back to the first question posed earlier in this article. “Is the American public ready to accept virtual trials?” An indication of the viability of trials held in cyberspace, one need only look as far as the more than 50 virtual worlds already existing within cyberspace. These include virtual worlds designed for children, such as “Whyville”, worlds designed for teens, such as “Dubit”, and worlds designed for adults, such as “Cybertown” and “Second Life.” Second Life,” a virtual world video computer game launched by “Linden Lab,” on June 23, 2003, now has more than 14 million
players, known as residents, who through their “avatars,” a digital representation of the resident, live and interact with each other completely within the virtual world.

In a February 2008 interview with Linden Lab Board Member Mitch Kapor, he was asked what he believed would be the most surprising impact of metaverse (virtual) technology within the next decade. Kapor responded; “I think it will become profoundly ordinary to spend a good portion of the day in some type of virtual world, a metaverse. In the same way, the use of the web went from weird and radical in 1994 to ordinary to be on a web site.”(Mitch Kapor Stanford 2008) According to Kapor, within the next decade, virtual environments will be accepted as common place, and completely integrated into our daily lives. In a keynote address given on July 7, 2008, at a virtual celebrating Second Life’s fifth anniversary, Kapor discussed what he believed is missing from avatar to avatar encounters, which is the ability to convey body language and facial expressions. In the keynote address Kapor went on to say he believed this missing element would soon be rectified, and that the ability to produce avatars that accurately reflected their owner and the owners expressions would soon be available.(Kapor 2008)

While it is true todays online virtual worlds are avatar based, it also is certain that continued improvements in technology will give us the ability to produce a lifelike representation within the virtual world. The growth of Second Life indicates that at least a portion of the public is ready to accept the virtual world. If, as Kapor believes, it is only a matter of time until virtual reality is completely integrated into our everyday lives, can virtual environments be effectively incorporated into criminal trials? To assess the likelihood of conducting a virtual trial we need only to look as far as the successful use of
video-conferencing in criminal proceedings today, and apply that success to trials conducted completely within a virtual environment.

**Videoconferencing, the road to the Virtual Trial**

Beyond the technological capacity to hold a trial in a virtual environment, there is the very real issue of protecting the rights guaranteed to us by the Sixth Amendment to the United States Constitution. Recent developments in electronic courtroom procedures may indicate there is the potential for courts to accept VR as an extension of other current technologies.

Video arraignment and video conferencing are commonplace within our justice system, and if a defendant waives the right to be present for arraignment, courts and law enforcement agencies are more than happy to utilize video systems. The Anaheim Police Department, located in Orange County, California is one example of an agency using video arraignment technology. Anaheim began their program in collaboration with the Orange County North Justice Center in January of 2007. According to Detention Manager Mike Richardson, individuals arrested and booked at the Anaheim Police Department Jail are given the option of either participating in the video arraignment program, or being transported to the North Orange County Justice Center for arraignment. Richardson went on to explain a public defender is physically present with the defendants, but that the judge, district attorney, court clerk, and court reporter are located at the North Justice Center. Richardson’s facility handles 75-100 arraignments per week, and according to Richardson, only a handful of arrestees opt out of the video arraignment program.
Frederic I. Lederer, Chancellor and Professor of Law at the College of William & Mary School in Virginia, and Founder of the Courtroom 21 Project, stated in Criminal Justice Magazine; “Criminal trials are in the process of change as a growing number of courtrooms nationwide offer counsel built-in, permanently installed technology.” (Courtroom Technology (Criminal Justice Magazine Spring 2004)) Lederer also stated in a 1999 article from Trial, “The new millennium will bring substantial changes in the way we try cases.” (Lederer, 1990) In an article entitled Courtroom Technology in the Spring 2004 edition of Criminal Justice Magazine, Lederer, stated, “...courtroom technology is rapidly becoming an ordinary and necessary aspect of trial presentation. (Lederer 2004) According to Lederer, videoconferencing has been used experimentally for both remote judges and remote counsel, and in a 2001 laboratory experiment, prosecution co-counsel conducted a critical witness examination from the United Kingdom. (Lederer 2001)

Along with Lederer, Chris Travers, owner of Real Verdict.com, stated in an article for Ezine Magazine, “We are heading towards a time when most legal disputes will be settled via online arbitration and trials.”(Virtual Courtrooms) Travers further believes that “eCourt” activity has evolved to the point that electronic access to court documents, case filings, juror notification, and scheduling has become common.

The question of whether the courts will accept an electronic representation of a witness at a criminal trial has been answered in the State of Florida v. Harrell, 709 So.2d 1364 (Fla.). In this instance the Florida Supreme Court ruled that remote testimony via satellite transmission, from victims in Argentina was admissible in a robbery trial. (Lederer 2001) Determining whether or not virtual trials will meet the standards of the Sixth Amendment will eventually fall upon the U. S. Supreme Court. To date, the Court
has been reluctant to rule on the issue, declining to accept the case of State of Florida v. Harrell mentioned above. (Lederer 2001)

Conclusion

It is certain that within the next twenty years, a VICE-like system will be capable of producing a trial environment comparable to an actual courtroom. VICE systems can afford the participants an immersive experience, complete with accurate representations of all parties, the manipulation of digital evidence and a complete and detailed record of everything that occurred. It is also relatively certain that acceptance of virtual reality will follow the same path of the Internet, which although universally accepted today, was regarded as extraordinary and unusual twenty years ago.

Two questions were posed at the beginning of this article. The first was is the concept of a virtual trial farfetched? Although virtual reality is a relatively new concept, I believe the significant advancements in computing power and cyberspace in the last ten years have made the answer to this question a resounding, NO. Virtual reality is not only conceivable, it is inevitable. The only question that remains to be answered is; will your agency be ready?
Works Cited

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