government still has not determined conclusively—or is unwilling to reveal—the purpose behind the beams".3 The US government did know what was happening. The Soviets had developed methods for disrupting the purposeful thought of humans and were using their knowledge to impact diplomats in the United States embassy in Moscow.

In 1994, a report concerning the MKULTRA program was issued, containing the following information:

"In the 1950s and '60s, the CIA engaged in an extensive program of human experimentation, using drugs, psychological, and other means, in search of techniques to control human behavior for counterintelligence and covert action purposes.

"In 1973, the CIA purposefully destroyed most of the MKULTRA files concerning its research and testing on human behaviour. In 1977, the agency uncovered additional MKULTRA files in the budget and fiscal records that were not indexed under the name MKULTRA. These documents detailed over 150 subprojects that the CIA funded in this area, but no evidence was uncovered at that time concerning the use of radiation.

"The CIA did investigate the use and effect of microwaves on human beings in response to a Soviet practice of beaming microwaves on the US embassy. The agency determined that this was outside the scope of the Advisory Committee's purview.

up with the Soviet advances in this field'. ...Helms attributed the cessation of the unwitting testing to the high risk of embarrassment to the Agency as well as the 'moral problem'. He noted that no better covert situation had been devised than that which had been used, and that 'we have no answer to the moral issue'."4

They did have the answers to the moral questions on human experimentation but chose to ignore them, destroy the records, hide the truth and still continue in their efforts. Nothing has changed as each participating organisation, using national security laws, avoids disclosure and accountability. The records which were destroyed contained the evidence necessary perhaps to send some participants to jail for society's version of behaviour modification. Once again, there was no accountability and no recognition of the rights of the individuals damaged by these experiments.

Mind Wars

"For the first time in some 500 years, a scientific revolution has begun that will fundamentally change the world as much as the Renaissance and Enlightenment did. A handful of extraordinary new advances in science are taking humans quickly and deeply into areas that will have profound implications for the future."5

One of these areas is control of the human mind. The issues surrounding behaviour

awesome impact on competition. The business that introduced a new product ten years ago could count on probably five years before it had to look seriously at potential competitors based overseas. Today, you're lucky if you can count on five months or even five weeks before you are facing the overseas competitor. In today's world, success simply demands rapid introduction of successively new products or military systems. Success now goes to the organization which exploits information almost instantly, while failure is the near certain fate of the organization which tries to husband or hide ideas. Real simple—use it or you're going to lose it.

"The third revolution, which is a little bit more complex, is the military/technological revolution, or in some places called the revolution in military affairs. I'm convinced that this is the first military technological revolution ever because we now have, for the first time, a conceptually different way to wage war. We can wage war in parallel now. In the past, communications and weapons technology, especially weapons accuracy, have constrained us to waging serial war. This changes almost everything.

"Biological Process Control: As we look forward to the future, it seems likely that this nation will be involved in multiple conflicts where our military forces increasingly will be placed in situations where the application of full force capabilities of our military might cannot be

the development of some novel capabilities that can be used in armed conflict, in terrorist/hostage situations, and in training. New weapons that offer the opportunity of control of an adversary without resorting to a lethal situation or to collateral casualties can be developed around this concept. This would offer significant improvements in the capabilities of our special operation forces.

"Initial experimentation should be focused on the interaction of electromagnetic energy and the neuromuscular junctions involved in voluntary muscle control. Theories need to be developed, modeled, and tested in experimental preparations. Early testing using in vitro cell cultures of neural networks could provide the focus for more definitive intact animal testing. If successful, one could envision a weapon that would render an opponent incapable of taking any meaningful action involving any higher motor skills (e.g., using weapons, operating tracking systems). The prospect of a weapon to accomplish this when targeted against an individual target is reasonable; the prospect of a weapon effective against a massed force would seem to be more remote. Use of such a device in an enclosed area against multiple targets (hostage situation) may be more difficult than an individual target system, but probably feasible.

"It would also appear to be possible to create high fidelity speech in the human body, raising the possibility of covert

specialized training. How this can be done or even if it can be done are significant unknowns [sic]. The impact of success would boggle the mind!"6

The above report was a forecast for the year 2020. However, the reality is that these technologies already exist and there are a number of patents in the open literature which clearly show the possibilities. This research is not new but goes back to the 1950s.

"A new class of weapons, based on electromagnetic fields, has been added to the muscles of the military organism. The C3I [Command, Control, Communications and Intelligence] doctrine is still growing and expanding. It would appear that the military may yet be able to completely control the minds of the civilian population."7

The targeting of civilian populations by the military is a significant departure from its history. In the past, the military has used persuasion through real information rather than using deliberate deception and mind manipulation to win populations over.

"A decoy and deception concept presently being considered is to remotely create the perception of noise in the heads of personnel by exposing them to low power, pulsed microwaves. When people are illuminated with properly modulated low power microwaves the sensation is reported as a buzzing, clicking, or hissing which seems to originate (regardless of the person's position in the field) within or

imagination and is used, very loosely, to describe any act committed against an individual by the Communists. Actual 'brainwashing' is a prolonged psychological process, designed to erase an individual's past beliefs and concepts and to substitute new ones. It is a highly coercive practice which is irreconcilable with universally accepted medical ethics. In the process of 'brainwashing', the efforts of many are directed against an individual. To be successful, it requires, among other things, that the individual be completely isolated from normal associations and environment."10 The ethical considerations have not changed, but the military's position on the ethics has changed as it has gained significant capabilities in these areas. "Psychological warfare is becoming increasingly important for US forces as they engage in peacekeeping operations. 'In the psychological operations area, we're always looking to build on our existing technologies, so much of this is evolutionary,' [military planner] Holmes said. 'It is critically important that we stay ahead of the technology curve."11 The temptation to dabble in this area has now overcome the ethical considerations.

A Russian military article offered a slightly different slant to the problem, declaring that "humanity stands on the brink of a psychotronic war" with the mind and body as the focus.11a These "psychotronic" weapons aim to control or alter the psyche, or to attack the various sensory and data-

ultimate target of information warfare is the information-dependent process, "whether human or automated", then the definition implies that human data-processing of internal and external signals can clearly be considered an aspect of information warfare.12

On a much grander scale, the use of mind control was contemplated as far back as 1969 by a former science adviser to President Johnson. "Gordon J. F. Macdonald, a geophysicist specializing in problems of warfare, has written that accurately timed, artificially excited strokes 'could lead to a pattern of oscillations that produce relatively high power levels over certain regions of the earth... In this way, one could develop a system that would seriously impair the brain performance of very large populations in selected regions over an extended period...'"13 This capability exists today through the use of systems which can stimulate the ionosphere to return a pulsed (modulated) signal which, at the right frequency, can override normal brain functions. By overriding the natural pulsations of the brain, chemical reactions are triggered which alter the emotional state of targeted populations.

Subliminal Messages and Commercial Uses

One of the areas where this new technology is being used is in systems to dissuade shoplifters, using sound below the range of hearing. "Japanese shopkeepers are playing

amplitudes of sensed audio signals. This amplitude controlled subliminal message may be mixed with background music and transmitted to the shopping area."16

"Data to be displayed is combined with a composite video signal. The data is stored in memory in digital form. Each byte of data is read out in sequential fashion to determine: the recurrence display rate of the data according to the frame sync pulses of the video signal; the location of the data within the video image according to the line sync pulses of the video signal; and the location of the data display within the video image according to the position information."17

"This invention is a combination of a subliminal message generator that is 100% user programmable for use with a television receiver. The subliminal message generator periodically displays user specified messages for the normal television signal for [a] specific period of time. This permits an individual to employ a combination of subliminal and supraliminal therapy while watching television."18

The above points may seem a bit complicated; however, they can be summarised. These patents are designed to provide a way to hide messages in video or audio formats, masking any suggestions that the programmer wishes to convey. These kinds of messages bypass the conscious mind and are acted upon by the person hearing them; they are not sorted out by the active mind. Although

has taken the courts even to recognise hypnotherapy as valid science. We are hopeful that we will not have to wait so long for legislative bodies to take the initiative to address these issues.

Auditory Effects

The questions which this section raises are profound. Is it possible to transmit a signal to the brain of a person, from a distance, which deposits specific sounds, voice or other information which can be understood? Is it possible to transfer sound in a way where only the targeted person can hear the "voice in the head" and no one else hears a thing? Is it possible to shift a person's emotions using remote electromagnetic tools? The answer to each of these questions is a resounding "Yes!" The state of the science has passed even the most optimistic predictions, and the capabilities are here now.

Military literature suggests that this is possible. A series of experiments, patents and independent research confirm that this technology exists today. While giving testimony to the European Parliament in 1998, I demonstrated one such device to the astonishment of those in attendance. This particular device required physical contact in order to work and was nearly forty years old. This area of research is one of the most important because it points to the ultimate weapon of political control: the ability to place information directly into

Koran and testimonials from well-treated Iraqi prisoners, was precise information on the units to be bombed each day, along with a new, silent psychological technique which induced thoughts of great fear in each soldier's mind..."21

This makes a great deal of sense today, given what has become increasingly known about mind-control weapons.

"According to statements made by captured and deserting Iraqi soldiers, however, the most devastating and demoralizing programming was the first known military use of the new, high tech, type of subliminal messages referred to as ultra-high-frequency 'Silent Sounds' or 'Silent Subliminals'."22

The use of these new techniques, we believe, went well beyond the injection of fear and may have involved more powerful signal generators which caused the other symptoms which the world observed, including head pain, bleeding from the nose, disorientation and nausea—all possible with so-called non-lethal weapons. The questions which now remain: Are they still using the techniques like an electronic concentration camp in order to control the population? Is this part of the way in which modern governments will suppress rogue nations?

The development of the technology followed a very traceable history which began in the early 1960s at the height of the Cold War. In 1961, Dr Allen Frey wrote: "Our data to date indicate that the human auditory system can respond to electromagnetic energy in at

By 1962, Dr Allan Frey had advanced his work and was able to create sound at a distance from the subject, using a pulsed (modulated) radio transmitter. "Using extremely low average power densities of electromagnetic energy, the perception of sounds was induced in normal and deaf humans. The effect was induced several hundred feet from the antenna the instant the transmitter was turned on, and is a function of carrier frequency and modulation."26

What was occurring in this research were the first attempts to "tune" into the brain of a human in the same manner as "tuning" into a radio station. The same energy was being used; it was just at a different frequency with a slight vibration (modulation) on the carrier wave which delivered the signal.

In 1968, G. Patrick Flanagan was issued a patent for a device which also required physical contact with the skin of the subject. "This invention relates to electromagnetic excitation of the nervous system of a mammal and pertains more particularly to a method and apparatus for exciting the nervous system of a person with electromagnetic waves that are capable of causing that person to become conscious of information conveyed by the electromagnetic waves."27

This invention was much different than what others had created by that time, because this device actually sent a clear, audible signal through the nervous system to the brain.

system for producing aural and psychological disturbances and partial deafness of the enemy during combat situations. Essentially, a high directional beam is radiated from a plurality of distinct transducers and is modulated by a noise, code, or speech beat signal. The invention may utilize various forms and may include movable radiators mounted on a vehicle and oriented to converge at a desired point, independently positioned vehicles with a common frequency modulator, or means employed to modulate the acoustical beam with respect to a fixed frequency. During combat, friendly forces would be equipped with a reference generator to provide aural demodulation of the projected signal, thereby yielding an intelligible beat signal while enemy personnel would be rendered partially deaf by the projected signal as well as being unable to perceive any intelligence transmitted in the form of a modulated beat signal."29 What this says simply is that at-a-distance personal communication could be achieved by one's own forces while denying it to others and disabling adversaries at the same time.

In 1974, it was noted that using a microwave a signal was changed (transduced) by the receiver into an acoustic signal. This signal was "heard" inside or just behind the head. The report stated: "...it was noticed that the apparent locus of the 'sound' moved from the observer's head to the absorber. That is, the absorber acted as a transducer

head with microwaves in the range of 100 megahertz to 10,000 megahertz that are modulated with a particular waveform. The waveform consists of frequency modulated bursts. Each burst is made up of ten to twenty uniformly spaced pulses grouped tightly together."33

In 1992, another patent was issued with the following description: "A silent communications system in which nonaural carriers, in the very low or very high audio frequency range or in the adjacent ultrasonic frequency spectrum, are amplitude or frequency modulated with the desired intelligence and propagated acoustically or vibrationally, for inducement into the brain, typically through the use of loudspeakers, earphones or piezoelectric transducers."34 This device had limited practicality in that it required the person to be in contact with or in close proximity to the sending device.

When examined together, each of these patents is seen to be a discrete step toward a new weapon system.

In 1995, it was reported that in the early research, clear sound signals had been sent and received. It is difficult now to determine what level of military or other research was being advanced in these areas. The history is clear from congressional reports that this entire area was of great interest to the intelligence communities. According to Scientists for Global Responsibility: "Drs Alan Frey and Joseph

the government, or you cannot continue research or even talk about your invention under a national security order. Those who did not cooperate could have their work effectively shut down.

Brain-to-Computer Connections

Major steps are being made to connect biology to information technology.

In 1990 came the news that "[s]cientists have succeeded for the first time in establishing a colony of human brain cells that divide and grow in laboratory dishes, an achievement with profound implications for understanding and treating a wide range of neurological disorders from epilepsy to Alzheimer's disease".37

According to a report in the Wall Street Journal in February 1994: "Researchers said they took a key first step toward creating electronic microchips that use living brain cells. The researchers said they had learned how to place embryonic brain cells in desired spots on silicon or glass chips and then induce the brain cells to grow along desired paths."38

The other possibility is that both brain cells and computer hardware could be built in the laboratories, creating, perhaps, the first biologically augmented computers.

What's on Your Mind?

A significant initiative was started for use in creating counter-drug measures: the Brain Imaging Technology Initiative. "This

population to diagnose and locate the origin of brain-dysfunctional underlying perception, conception and emotion.41 In other words, the device reads your mind by comparing your brain activity to other people's.

In 1996 came this Orwellian development: "...a method for remotely determining information relating to a person's emotional state, as waveform energy having a predetermined frequency and a predetermined intensity is generated and wirelessly transmitted towards a remotely located subject. Waveform energy emitted from the subject is detected and automatically analyzed to derive information relating to the individual's emotional state. Physiological or physical parameters of blood pressure, pulse rate, pupil size, respiration rate and perspiration level are measured and compared with reference values to provide information utilizable in evaluating [an] interviewee's responses or possibly criminal intent in security sensitive areas."42 This technology could be used for determining what a person might do, given his totally discernible interior emotions. This technology walks through any behaviour wall a person can erect and goes straight to the brain to see what may be on a person's mind.

Inducing behaviour rather than just reading a person's emotional state is the subject of one scientist's work in Canada. "Scientists are trying to recreate alien abductions in

1975 patent discussed a similar technology: a device and method for "...sensing brain waves at a position remote from a subject whereby electromagnetic signals of different frequencies are simultaneously transmitted to the brain of the subject in which the signals interfere with one another to yield a waveform which is modulated by the subject's brain waves. The interference waveform which is representative of the brain wave activity is retransmitted by the brain to a receiver where it is demodulated and amplified. The demodulated waveform is then displayed for visual viewing and then routed to a computer for further processing and analysis. The demodulated waveform also can be used to produce a compensating signal which is transmitted back to the brain to effect a desired change in electrical activity therein."47 In simple terms, the brain's activity is mapped in order to read a person's emotional state, conceptual abilities or intellectual patterns. A second signal can be generated and sent back into the brain which overrides the natural signal, causing the brain's energy patterns to shift. This is the "brain entrainment" which causes the shift in consciousness. There are many uses of a positive nature for this kind of technology, as was mentioned at the front of this section, the important factor being who controls the technology and for what purpose.

In January 1998, the following encapsulating statement appeared in the leading scientific

"movements, sensations, emotions, desires, ideas, and a variety of psychological phenomena may be induced, inhibited, or modified by electrical stimulation of specific areas of the brain".50 By 1985, Dr Delgado was able to create these effects using only a radio signal sent to the brain remotely, using energy concentrations of less than 1/50th of what the Earth naturally produces. This discovery implied that frequency, waveform and pulse rate (modulation) were the important factors rather than the amount of energy being used. In considering this, it makes sense because the human body does not require high electromagnetic power concentration to regulate its normal functioning. The key was in finding the "tuning" mechanisms for locating the right "receiving station" in the brain.

By 1993, publicly released information was being discussed as a result of information openly flowing out of Russia. Meetings were held to assess the threat: the "main purpose of the March meetings was described in the Psychotechnologies memo as to 'determine whether psycho-correction technologies represent a present or future threat to US national security in situations where inaudible commands might be used to alter behavior'".51 The threat assessment was likely to begin to condition Americans for the public acknowledgement of one of the government's long-held secrets: that the human mind and body can be controlled

often exhibit telltale signs as children and as adults. Hence, disturbed employees or students may demonstrate signs of violent fantasies to close observers. Troubled individuals may be obsessively interested in music with violent lyrics, or may have a drug or alcohol problem. When these signs reveal themselves, they should be reported to a threat management team, which can then neutralize the threat, either by therapy, if rehabilitation is possible, or by firing the employee. Workplace and school violence is usually preceded by warning signs."53 The ability to determine a "predisposition" for a behaviour does not mean that a person will make the "choice" to act on the feelings and internal thoughts. Every person on the planet can remember times when his thoughts were dangerous, immoral or otherwise unacceptable, falling below the standards set by societal and cultural "norms". Yet, we can have these thoughts in the privacy of our own mind.

The trend in the application of mind control technology now would make our most private internal thoughts, as we wrestle with the temptations and choices of everyday life, subject to scrutiny by government and employers. Who will define the rules for psycho-correction? Who will decide what is ethical and right in this area as it develops over the next decade?

Control of the Mind and Body

causing changes in the brain waves, which then cause changes in brain chemistry, which then cause changes in brain outputs in the form of thoughts, emotions or physical condition. As you are driven, so you arrive. Brain manipulation can be either beneficial or detrimental to the individual being impacted, depending on the level of knowledge or the intentions of the person controlling the technology.

In combination with specific wave-forms, the various frequencies trigger precise chemical responses in the brain. The release of these neurochemicals causes specific reactions in the brain which result in feelings of fear, lust, depression, love, etc. All of these, and the full range of emotional/intellectual responses, are caused by very specific combinations of these brain chemicals which are released by frequency-specific electrical impulses. "Precise mixtures of these brain juices can produce extraordinarily specific mental states, such as fear of the dark, or intense concentration."56

The work in this area is advancing at a very rapid rate, with new discoveries being made regularly. Unlocking the knowledge of these specific frequencies will yield significant breakthroughs in understanding human health. Radiofrequency radiation, acting as a carrier for extremely low frequencies (ELF), can be used to entrain brain waves wirelessly.

and are noted for their calming effects in helping people relax and sleep.

In 1980, another patent was issued which disclosed "...a method and apparatus for producing a noise-like signal for inducing a hypnotic or anesthetic effect in a human being. The invention also has application in crowd control and consciousness level training (biofeedback). The invention may also be used in creating special musical effects."59 This device would have a profound effect in controlling individuals to a point otherwise only achievable through the application of hypnotherapy or drugs. A couple of years later, another device was engineered to create these types of effects, again using very subtle energy: "Brain wave patterns associated with relaxed and meditative states in a subject are gradually induced without deleterious chemical or neurological side effects."60

Various systems were perfected and patents issued for controlling brain activity.61, 62, 63, 64, 65, 66, 67, 68 These inventions generated a whole array of breakthroughs for controlling a person's emotional state, concentration and pain levels and creating other effects as well. In 1990, the results of a study strongly indicated that "...specific types of subjective experiences can be enhanced when extremely low frequency magnetic fields of less than 1 milligauss are generated through the brain at the level of the temporal lobes. Vestibular feelings (vibrations, floating), depersonalization

theta brainwave states and effecting positive emotional states in humans was developed.71 Three years before, a patent was issued for a device which could create desired consciousness states: "...in the training of an individual to replicate such states of consciousness without further audio stimulation; and in the transferring of such states from one human being to another through the imposition of one person's EEG, superimposed on desired stereo signals, on another individual, by inducement of a binaural beat phenomenon."72

Thought transference?

This is interesting in that it speaks to the ideas alluded to earlier by the military in changing the memory of a person by imposing computer-manipulated signals which would integrate with the normal memory of a person. The possibility for abuse is obvious, and the opportunity for personal advancement is great. Imagine gaining education by the transfer of data directly into the human brain by these new methods rather than by the standard methods of learning.

A serious consideration in developing these types of memory transfer systems is that they bypass normal intellectual filters: information is deposited into the brain as fact, without question or careful consideration. What happens when the new information conflicts with existing information? Would it be possible to include

rate, secondary modulation, and symmetry and asymmetry of the pulse. Many of the clinical effects of electromagnetic radiation were first noticed using direct current applied directly to the skin. Later the same effects were obtained by applying external fields. Electromagnetic radiation has been reported in the literature to induce or enhance the following effects.

1. Stimulation of bone regeneration [in fractures]
2. Healing of normal fractures
3. Treatment of congenital pseudarthrosis
4. Healing of wounds
5. Electroanesthesia
6. Electroconvulsive therapy
7. Behavior modification in animals
8. Altered electroencephalograms in animals and humans
9. Altered brain morphology in animals
10. Effects of acupuncture
11. Treatment of drug addiction
12. Electrostimulation for relief of pain
13. Altered firing of neuronal cells

"These are but a few of the many biological effects and uses that have been reported over the past decade. They are not exhaustive and do not include many of the effects reported in the Soviet and East European literature.

"As with most human endeavors, these applications of electromagnetic radiation have the potential for being a double-edged sword. They can produce significant benefits, yet at the same time can be

'A rapidly scanning RFR system could provide an effective stun or kill capability over a large area. System effectiveness will be a function of wave form, field intensity, pulse widths, repetition frequency, and carrier frequency. The system can be developed using tissue and whole animal experimental studies, coupled with mechanisms and waveform effects research.
'Using relatively low-level RFR it may be possible to sensitize large military groups to extremely dispersed amounts of biological or chemical agents to which the unirradiated population would be immune.
'The potential applications of artificial electromagnetic fields are wide ranging and can be used in many military or quasi-military situations.
'Some of these potential uses include dealing with terrorist groups, crowd control, controlling breeches [sic] of security at military installations, and antipersonnel techniques in tactical warfare... One last area where electromagnetic radiation may prove to be of some value is in enhancing abilities of individuals for anomalous phenomena.'"74
Quite the papers for the 1980s. Stimulating anomalous phenomena was another interesting point revealed in the Air Force review. What could this mean? In one press report in November 1995, the interest of the CIA was disclosed when it was announced that for "...20 years, the United States has secretly used psychics in attempts to help drug

pains. The highest settings can cause a person's bones to literally explode internally. Aimed at the head, the resonating skull bones have caused people to hear 'voices'." The weapon was researched by the Russian military more extensively than by the US. Indeed, "...the Russians actually offered the use of such a weapon to the FBI in the Branch Davidian standoff to make them think that 'God' was talking to them. Concerned with the unpredictability of what the voices might actually say to the followers, the FBI declined the offer. Another RF weapon that was ready for use back in 1978 was developed under the guise of Operation PIQUE. Developed by the CIA, the plan was to bounce high powered radio signals off the ionosphere to affect the mental functions of people in selected areas, including Eastern European nuclear installations."78

The use of the ionosphere in the CIA's experiments reminds one of the possibilities now available with systems such as HAARP, which was developed 15 years later. What is clear in all of this is that these systems have been developed and hidden from public view. The practice continues to this day.

"The next area of non-lethal weapons is primarily used against machinery...these devices can either cause the machinery to stop functioning or to render it vulnerable to further, more lethal attacks. In addition to this effect, man has become very dependent upon the use of machines and is

for the detection of these technologies in order to control abuse.

Mind Control Victims

Sometimes referred to as "wavies" or "beamers", these individuals are usually dismissed when asserting that they are the victims of mind control weapons testing. In fact: "University of South Florida researchers have published a study showing that fears of the Internet are replacing the CIA and radio waves as a frequent delusion in psychiatric patients. In every case of Internet delusion documented by the researchers, the patient actually had little experience with computers."80

The problem is that it is difficult if not impossible to sort out which people might be victims and which are delusional. Attempts to determine the reality of the complaints are often the butt of jokes and fear. For example, the University of Albany has "...shut down the research of a psychology professor probing the 'X-Files' world of government surveillance and mind control. At conferences, in papers and research over two semesters, Professor Kathryn Kelley explored the claims of those who say they were surgically implanted with communications devices to read their thoughts."81

Since the release of our first book, *Angels Don't Play This HAARP: Advances in Tesla Technology*,82 we have heard from hundreds of people making such claims. We cannot sort out what might be real experimentation from

3. Reppert, Barton, "The Zapping of an Embassy: 35 Years Later, The Mystery Lingers", AP, May 22, 1988. EPI1112
4. Advisory Committee Staff, Committee on Human Radiation Experiments, Methodological Review of Agency Data Collection Efforts: Initial Report on the Central Intelligence Agency Document Search, June 27, 1994. EPI579
5. Petersen, John L., *The Road to 2015: Profiles of the Future*, Waite Group Press, 1994, ISBN 1-878739-85-9. EPI849
6. USAF, *New World Vistas*, ibid.
7. US EPA, Summary and Results of the April 26-27, 1993 Radiofrequency Radiation Conference, Volume 2: Papers, 402-R-95-011, March 1995. EPI728
8. Oscar, K.J., "Effects of low power microwaves on the local cerebral blood flow of conscious rats", Army Mobility Equipment Command, June 1, 1980. EPI1195
9. Delgado, José M.R., *Physical Control of the Mind: Toward a Psychocivilized Society*, Harper & Row Publishers, New York, 1969. EPI850
10. US Senate, Communist Interrogation, Indoctrination and Exploitation of American Military and Civilian Prisoners, Committee on Government Operations, Subcommittee on Investigations, 84th Congress, 2nd Session, December 31, 1956. EPI1131
11. Cooper, Pat, "US Enhances Mind Games", *Defense News*, April 17-23, 1995. EPI1154

Auditory Effect", SBIR Contract Number F41624-95-C-9007. EPI277
21. ITV News Bureau, "A Psy-Ops Bonanza On The Desert", 1991, **http://www.mindspring.com/~silent/xx/daisy.htm. EPI568**
22. ITV News Bureau, "High Tech Psychological Warfare Arrives in the Middle East", 1991, **http://www.mindspring.com/~silent/xx/news.htm. EPI567**
23. Frey, Allan H., "Auditory System Response to Radio Frequency Energy", *Aerospace Medicine*, December 1961, vol. 32, pp. 1140-1142. EPI370
24. US Patent #2,995,633, August 8, 1961, "Means for Aiding Hearing"; Inventors: Puharich et al. EPI256
25. US Patent #3,170,993, February 23, 1965, "Means for Aiding Hearing by Electrical Stimulation of the Facial Nerve System"; Inventors: Henry K. Puharich and Joseph L. Lawrence. EPI1119
26. Frey, Allan H., "Human Auditory System Response to Modulated Electromagnetic Energy", *Journal of Applied Physiology* 17(4):689-692, 1962. EPI544
27. US Patent #3,393,279, July 16, 1968, "Nervous System Excitation Device"; Inventor: Flanagan, Gillis Patrick; Assignee: Listening Incorporated. EPI261
28. US Patent #3,647,970, March 7, 1972, "Method and System of Simplifying Speech Waveforms"; Inventor: Flanagan, Gillis P.

39. ONDCP, CTAC, "Counterdrug Research and Development Blueprint Update", **http://www.whitehousedrugpolicy.gov/scimed/blueprint99/execsumm.htm**
40. Cohen, David, "Magnetic Fields of the Human Body", *Physics Today*, August 1975. EPI1179
41. US Patent #5,392,788, Feb. 28, 1995, "Method And Device For Interpreting Concepts And Conceptual Thought From Brainwave Data And For Assisting For Diagnosis Of Brainwave Dysfunction"; Inventor: Hudspeth, William J. EPI1129
42. US Patent #5,507,291, April 16, 1996, "Method And An Associated Apparatus For Remotely Determining Information As To Person's Emotional State"; Inventors: Stirbl et al. EPI1130
43. Watts, Susan, "Alien kidnaps may just be mind zaps", *The Sydney Morning Herald*, November 19, 1994. EPI816
44. Opall, Barbara, "US Explores Russian Mind-Control Technology", *Defense News*, January 11-17, 1993. EPI818
45. Persinger, M. et al., "Partial Amnesia for a Narrative Following Application of Theta Frequency EM Fields", *Journal of Bioelectricity* 4(2):481-494 (1985). EPI372
46. US Patent #5,036,858, Aug. 6, 1991, "Method And Apparatus For Changing Brain Wave Frequency"; Inventors: Carter et al. EPI1127
47. US Patent #3,951,134, April 20, 1976, "Apparatus And Method For Remotely Monitoring And Altering Brainwaves";

and Somatic Diseases with Heat, Light, Sound and VHF Electromagnetic Radiation"; Inventors: Rabichev et al. EPI257
58. US Patent #4,034,741, July 12, 1977, "Noise Transmitter and Generator"; Inventors: Adams et al.; Assignee: Solitron Devices Inc. EPI267
59. US Patent #4,191,175, March 4, 1980, "Method and Apparatus for Repetitively Producing a Noise-Like Audible Signal", Inventor: Nagle, William L. EPI269
60. US Patent # 4,335,710, June 22, 1982, "Device for the Induction of Specific Brain Wave Patterns"; Inventor: Williamson, John D.; Assignee: Omnitronics Research Corporation. EPI292
61. US Patent #4,717,343, Jan. 5, 1988, "Method of Changing a Person's Behavior"; Inventor: Densky, Alan. EPI284
62. US Patent #4,834,701, May 30, 1989, "Apparatus for Inducing Frequency Reduction in Brainwave", Inventor: Masaki, Kazumi; Assignee: Hayashibara, Ken. EPI266
63. US Patent #4,889,526, Dec. 26, 1989, "Non-Invasive Method and Apparatus for Modulating Brain Signals Through an External Magnetic Or Electric Field To Reduce Pain"; Inventors: Rauscher, Elizabeth A. and Van Bise, William L.; Assignee: Megatech Laboratories, Inc. EPI268
64. US Patent #4,227,516, Oct. 14, 1990, "Apparatus for Electrophysiological Stimulation"; Inventors: Meland et al. EPI283

Brainwave States in Humans", Inventor: Davis, Mark E. EPI296
72. US Patent #5,213,562, May 25, 1993, "Method of Inducing Mental, Emotional and Physical States of Consciousness, Including Specific Mental Activity in Human Beings"; Inventor: Monroe, Robert; Assignee: Interstate Industries, Inc. EPI287
73. Hotz, Robert Lee, "Listening to Mozart a real - but temporary - IQ builder, study says", *Anchorage Daily News*, October 15, 1993. EPI529
74. Tyler, Capt. Paul E., MC, USN, "The Electromagnetic Spectrum in Low-Intensity Conflict" in Lt. Col. David Dean (ed.), *Low-Intensity Conflict and Modern Technology*, Air University Press, June 1986. EPI709
75. Cole, Richard, "ESP spies, 'Stargate' are psychic reality", Saint Paul Pioneer Press, November 30, 1995. EPI491
76. Morehouse, David, *Psychic Warrior*, Michael Joseph Ltd, UK, St Martin's Press, USA, 1996.
77. Aftergood, Steven, "The ''Soft Kill' Fallacy", *Bulletin of the Atomic Scientists*, September/October 1994. EPI281
78. Suhajda, Joseph M., "Non-Lethal Weapons for Military Operations Other Than War", at **http://www.usafa.af.mil/wing/34edg/airman/suhajd~1.htm**. EPI348
79. ibid.
80. "Internet Feeds Delusions", Associated Press, July 5, 1999. EPI123

DEPARTMENT OF THE ARMY
UNITED STATES ARMY INTELLIGENCE AND SECURITY COMMAND
FREEDOM OF INFORMATION/PRIVACY OFFICE
FORT GEORGE G. MEADE, MARYLAND 20755-5995

REPLY TO
ATTENTION OF:

DEC 13 2006

Freedom of Information/
Privacy Office

Mr. Donald Friedman
Confidential Legal Correspondence
1125 Third Street
Napa, California 94559-3015

Dear Mr. Friedman:

References:

a. Your Freedom of Information Act (FOIA) request dated May 25, 2006, to the Department of the Army, Freedom of Information/Privacy Act Division (DA FOIA/PA DIV), for all documents pertaining to the microwave auditory effect, microwave hearing effect, Frey effect, artificial telepathy, and/or any device/weapon which uses and/or causes such effect; and any covert or undisclosed use of hypnosis. On September 5, 2006, the DA FOIA/PA DIV referred a copy of your request to this office. Your request was received on September 11, 2006.

b. Our letter of September 13, 2006, informing you of the search for records at another element of our command and were unable to comply with the 20-day statutory time limit in processing your request.

As noted in our letter, the search has been completed with another element of this command and the record has been returned to this office for our review and direct response to you.

We have completed a mandatory declassification review in accordance with Executive Order (EO) 12958, as amended. As a result of this review, it has been determined that the Army information no longer warrants security classification protection and is releasable to you. A copy of the record is enclosed for your use.

Fees for processing your request are waived.

In normal functioning the degree of neuronal synchronization is highly controlled. From experiments that record the neuronal activity in different brain areas simultaneously in animals, it is known that correlation of spike activity between neurons (measured by the correlation level of synchronization) changes depending on the stage of behavior, motivation, attention, or activation of the memory processes. However, under some conditions, such as physical stress, heat shock, or strong emotional stress, the level of synchronization may become higher, involving nonspecific large populations of brain neurons and the synchronization may become uncontrollable.

Depending on at which frequency the synchronization rhythm occurs and how many neurons are involved, it may produce different physical effects; muscle weakness, involuntary muscle contractions, loss of consciousness, or intense (tonic) muscle spasms. The higher level of synchronization takes place in persons affected with epilepsy when they experience periodic seizures since they have a pathologic source (e.g., from injury to the brain) of rhythmic synchronization. Because the neurophysiological mechanisms of epileptiform synchronization are better documented, this incapacitating technology is described in terms of epileptogenesis.

The neurophysiological mechanisms active in epileptogenesis involve changes in membrane conductances and neurotransmitter alterations as they affect neuronal interaction. In the process of epileptogenesis, either some neurons are discharging too easily because of alterations in membrane conductances or there is a failure of inhibitory neurotransmission. The actual discharges have been recognized to result from a neuronal depolarization shift with electrical synchrony in cell populations related in part to changes in membrane conductances. The ionic basis and biochemical substrate of this activation have been areas of considerable study but still leave many questions unanswered. What are the basic cellular properties, present in normal cells and tissue, that could contribute to the generation of abnormal activity? What parts of the systems are low threshold and function as trigger elements?

One of the current hypotheses is involved with microcircuitry, particularly local synaptic interactions in neocortical and limbic system structures. In the hippocampus, the role of the trigger element has been long attributed to the CA3 pyramidal cells--a hypothesis based on the fact that spontaneous synchronous burst discharge can be established in CA3 neurons Some studies describe an intrinsically bursting cell type in the neocortex that plays a role similar to that of CA3 cells in the hippocampus and that of deep cells in the pyriform cortex. The intrinsic nature of these cells appears to be an important contributor to the establishment of synchronized bursting in these regions. Another apparent requirement in such a population is for a certain degree of synaptic interaction among neurons, such that discharge of even one cell enlists the activity of its neighbors. Given the presence of these bursting cells and the occurrence of excitatory interactions among them in normal tissue, it may actually be the morphologic substrate for epileptiform discharges.

Another hyptothesis has focused particularly on the role of N-methyl-D-aspartate (NMDA) receptors. Various factors regulate the efficacy of NMDA receptors: their

demonstrably on December 16, 1997 on Japanese television when hundreds of viewers of a popular cartoon show were treated, inadvertently, to photic seizure induction (figure 31). The photic-induced seizure is indirect in that the eye must receive and transmit the impulses which initially activate a portion of the brain associated with the optic nerve. From that point the excitability spreads to other portions of the brain. With the electromagnetic concept, excitation is directly on the brain, and all regions are excited concurrently. The onset of synchony and disruption of muscular control is anticipated to be nearly instantaneous. Recovery times are expected to be consistent with, or more rapid than, that which is observed in epileptic seizures.

Time to Onset

No experimental evidence is available for this concept. However, light-induced seizures latency onset in photosensitive epileptics varies from 0.1 to about 10 seconds. Because of the fact that the electrical impulses triggered by light must spread to other parts of the brain, photic-induced seizures are expected to have a generally slower onset than neural synchrony induced by high-strength pulsed electric fields.

Duration of Effect

For epileptic individuals, the typical duration of a petit mal event or a psychomotor event is 1 minute or 2, possibly longer, while the duration of a grand mal seizure is 1 to 5 minutes. In a non-epileptic individual who is induced by electromagnetic means, the durations of the different events are expected to be roughly the same as the epileptic individual's events after the external excitation is removed.

Tunability

There are many degrees of epileptic seizure in diseased persons, and it seems reasonable that electromagnetic stimulation of neural synchrony might be tunable with regard to type and degree of bodily influence, depending on the parameters associated with the chosen stimulus. Because there are no actual data to build on, these statements must be considered tentative. It is known that in the study of photic-induced seizures, parameters can be varied so that the individual under study does not actually undergo a grand mal seizure. This knowledge gives confidence that the proposed technology would be tunable.

Distribution of Human Sensitivities to Desired Effects

It is anticipated that 100% of the population would be susceptible. The mechanism is one that could act on many individual neuronal cells concurrently and hence does not depend on spreading regions of electrical activity as in the disease state.

Possible Influence on Subjects(s)

If the technology functions approximately as envisioned, the targeted individual could be incapacitated very quickly. Because there have been no reported studies using the

The two lateral semicircular canals, one located in each inner ear, alert a person to the fact that his upright head is experiencing angular acceleration. Within the ampulla of the canal are several so called hair cells. The cilia of these cells protrude into the lumen of the ampulla where they are encased in a mass of jelly-like material (the cupula) which is attached to the opposite wall of the canal. As the head accelerates, the cilia are bent by an inertial force of the cupula and the viscous liquid in the canal lumen. The bending of the cilia excites hair cells which in turn excite afferent neurons; these then alert the brain that a change of position of the head has occurred. Similar events occur when the head stops moving. The result of a strong hair cell stimulus to the brain is a rapid eye movement, call nystagmus, a feeling of dizziness and disorientation, and a possibility of nausea and vomiting.

Normal hearing is in the range between the frequencies of 20,000 to 16,000 Hz with the optimal sensitivity for most people between the frequencies of 500 to 6000 Hz.

Mechanism to Produce the Desired Effects

Because the end organs for acoustic and vestibular perception are so closely related, intense acoustic stimulation can result in vestibular effects. The hypothesis is that the sound of normal intensity produces oscillations of the endolymph and perilymph, compensated for by oscillations of the round window. High intensity sound produces eddy currents, which are localized rotational fluid displacements. High intensity sound can also produce nonlinear displacement of the stapes, causing a volume displacement, the result of which can be a fluid void in the labyrinth. To fill the void, fluid may be displaced along the endolymphatic duct and/or block capillary pathways, which, in turn, could stimulate vestibular receptors. Stimulation of the vestibular receptors may lead to nausea and vomiting if the sound pressure level is high enough. Conclude that both eddy currents and volume displacement serve to stimulate vestibular receptors in humans, when exposed to high levels of noise.

One study found nystagmum in guinea pigs exposed to high levels of infrasound via stimulation of the vestibular receptors. However, the same lab was unable to produce nystagmus in human subjects at 5- and 10-second exposures to a pure tone at 135 dB, broadband engine noise, or a 100 Hz tone at 120 dB, pulsed three times/s or 2 minutes. The same research was unable to elicit nystagmus at levels up to 155 dB, and also equally unable to produce nystagmus using infrasound levels of 112-150 dB in guinea pigs, monkeys, and humans. However, research with audible components in the sound spectrum with guinea pigs and monkeys produced nystagmus. Other researchers report other vestibular effects in addition to nystagmus at the following thresholds: 125 dB from 200-500 Hz, 140 dB at 1000 Hz, and 155 dB at 200 Hz. Decrements in vestibular function occur consistently for broadband noise levels of 140 dB (with hearing protection).

Human subjects listened to very high levels of low-frequency noise and infrasound in the protected or unprotected modes. Two-minute duration as high as 140 to 155 dB produced a range of effects from mild discomfort to severe pressure sensations, nausea, gagging,

dB(A) is to be avoided and that 70 dB(A) is assumed safe. Is believed that the noise energy with predominating frequencies above 500 Hz have a greater potential for hearing loss than noise energy at lower frequencies. Occupational standards for noise state that a person may be exposed continuously for 8 hours to 90 dB(A) or 15 minutes to 115 dB(A).

Possible Influence on Subject(s)

Induction of nystagmus and nausea will have variable effects on individuals. Effects may be sufficiently incapacitation to allow offensive advantage; the perception of sickness may make a subject susceptible to persuasion. It would be difficult to target single individuals at the present level of sound directing technology. This technology may be better suited for groups of people.

Technological Status of Generator/Aiming Device

Sound generating technology is well developed but not highly portable. Aiming devices are poorly developed.

Range

Under normal circumstances the sound pressure level decreases 6 dB(A) when the distance from the source is doubled. For example if the sound is 100 dB(A) at 100 ft, at 200 ft the sound would be 94 dB(A). At very high sound levels, certain conditions may lead to nonlinear effects in propagation and greatly increase range accuracy.

Defeat Capabilities/Limitations

Negative effects of audible sound are greatly decreased if hearing protection is worn. High frequency sound is more easily blocked than low frequency sound due to wavelength effects.

Laser-Induced Biological Effects

Their are three basic damage mechanisms associated with exposure to laser radiation: chemical, thermal, and mechanical or acoustic-mechanical.

The laser-induced, chemical alterations in irradiated tissue are referred to as photochemical damage. The likelihood of laser radiation in the blue-light portion of the electromagnetic spectrum (.380 to .550 microns) inducing photochemical reactions progressively decreases with increasing wavelength. Photochemical effects are not observed upon exposure to radiation with wavelengths exceeding .550 to .650 microns because the kinetic energy associated with these photons is insufficient to initiate a photochemical change.

Nonlethal blinding laser weapons generally use collimated beams with very low beam divergence, and the energy contained in the beam diminishes relatively slowly over great distances. Imaging systems such as eyes and EO vision systems have focusing optics that bring the incident plane wave of light to focus at the sensor plane. This results in a high optical gain (greater than 100,000 for eyes), which makes the associated sensor vulnerable to relatively low fluences of laser energy.

The effects of lasers on eyes are threefold:

- Dazzling or induced glare.
- Flashblinding or loss of night adaptation.
- Permanent or semipermanent blinding.

The severity of laser eye injuries varies according to the incident power, spot size, beam angle, pupil diameter (ambient light conditions), temporal mode (CW or pulsed), and PRF of the laser. Reported effects include corneal burns, cataracts (a permanent cloudiness of the lens), and retinal burns and perforations. Low-energy laser weapons are capable of causing the latter.

Exposure to relatively low laser energies can produce temporary changes in the ability to see without producing permanent injury. Exposure to laser light can produce an effect called glare or dazzle, which is similar to the temporary loss of vision experience when viewing the headlights of an oncoming car. The visual effects last only as long as the light is present in the field of view (FOV). At slightly higher energy exposures, the same laser radiation can saturate or flashblind the photoreceptor cells, resulting in after images that fade with time after exposure. Only visible radiation will induce veiling glare or after images; near-IR radiation will not produce these effects even though the radiant energy reaches the photoreceptor cells. Flashblindness and dazzle, while not permanent injuries, can cause discomfort and temporary loss of vision. Some studies have shown that dazzle and flashblindness can seriously impact mission performance, especially in highly visual tasks such as piloting an aircraft or aiming.

Blinding is the permanent or semipermanent loss of visual acuity. The effect can last from several hours onward and generally is evidenced by a dark spot in the field of vision. This spot is called a scotoma. The impact of the scotoma on visual acuity will vary with the size and position of the injury. Human vision is greatly affected when the laser damage is to the central vision area of the retina called the fovea. Nonfoveal laser damage may be less severe or even go unnoticed because it affects only the peripheral vision. The most serious retinal injuries occur when the incident light is so intense that a perforation in the retina is formed, resulting in a hemorrhage into either the subretinal layer or, in the most severe cases, the vitreous humor of the eye. Less severe exposures result in lesions on the retina.

Footnote:

1-(U) This appendix is classified FOR OFFICIAL USE ONLY in its entirety.

US006470214B1

(12) **United States Patent**
O'Loughlin et al.

(10) **Patent No.: US 6,470,214 B1**
(45) **Date of Patent: Oct. 22, 2002**

(54) **METHOD AND DEVICE FOR IMPLEMENTING THE RADIO FREQUENCY HEARING EFFECT**

(75) Inventors: **James P. O'Loughlin**, Placitas; **Diana L. Loree**, Albuquerque, both of NM (US)

(73) Assignee: **The United States of America as represented by the Secretary of the Air Force**, Washington, DC (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **08/766,687**

(22) Filed: **Dec. 13, 1996**

(51) **Int. Cl.**[7] **H04B 7/00**
(52) **U.S. Cl.** **607/56**; 128/898
(58) **Field of Search** 607/55, 56; 600/559, 600/23, 586; 128/897, 898

(56) **References Cited**

U.S. PATENT DOCUMENTS

3,563,246	A *	2/1971	Puharick	128/422
3,629,521	A *	12/1971	Puharick	179/107
4,835,791	A *	5/1989	Daoud	375/61

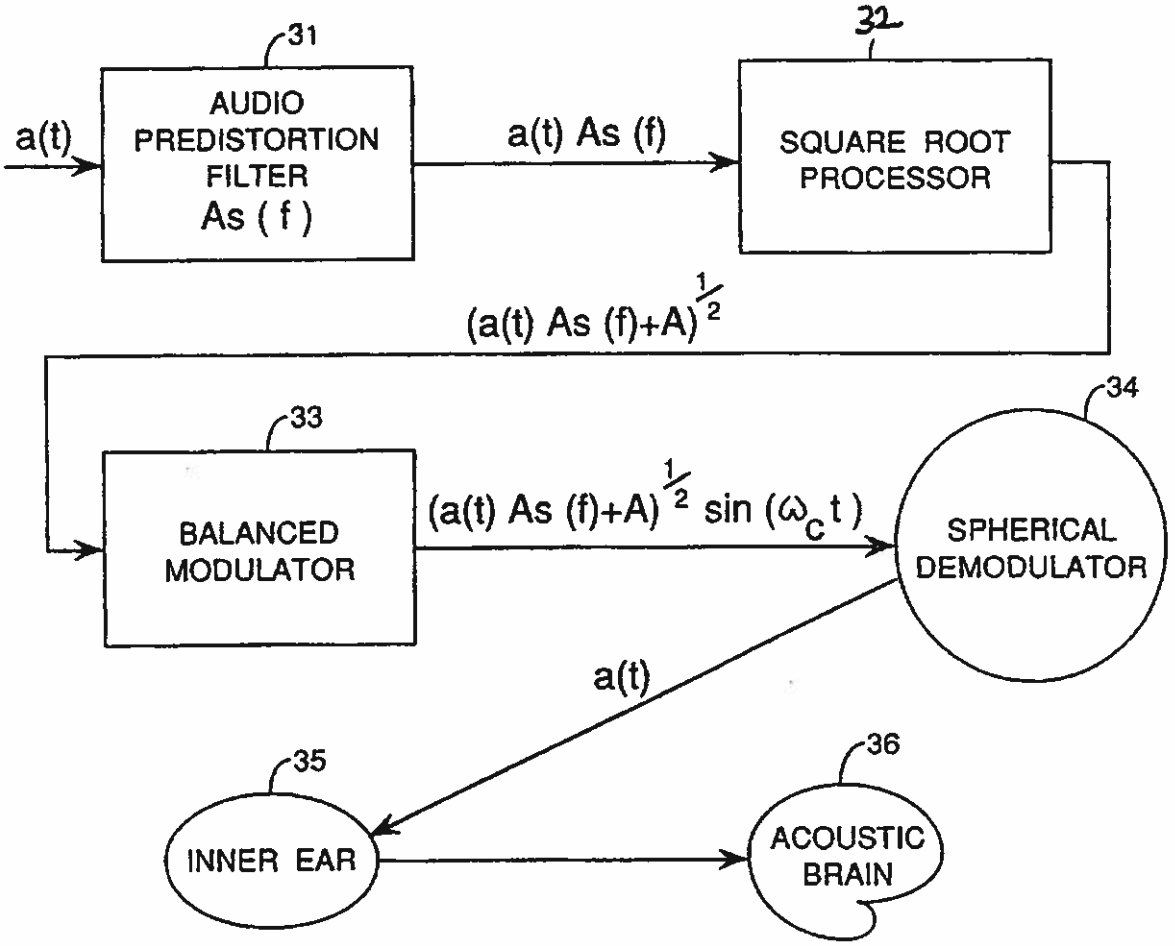
* cited by examiner

Primary Examiner—Kennedy Schaetzle
(74) *Attorney, Agent, or Firm*—James M. Skorich; Kenneth E. Callahan

(57) **ABSTRACT**

A modulation process with a fully suppressed carrier and input preprocessor filtering to produce an encoded output; for amplitude modulation (AM) and audio speech preprocessor filtering, intelligible subjective sound is produced when the encoded signal is demodulated using the RF Hearing Effect. Suitable forms of carrier suppressed modulation include single sideband (SSB) and carrier suppressed amplitude modulation (CSAM), with both sidebands present.

3 Claims, 3 Drawing Sheets



United States Patent [19]

Malech

[11] **3,951,134**

[45] **Apr. 20, 1976**

[54] **APPARATUS AND METHOD FOR REMOTELY MONITORING AND ALTERING BRAIN WAVES**

[75] Inventor: **Robert G. Malech**, Plainview, N.Y.

[73] Assignee: **Dorne & Margolin Inc.**, Bohemia, N.Y.

[22] Filed: **Aug. 5, 1974**

[21] Appl. No.: **494,518**

[52] U.S. Cl. ..... **128/2.1 B**

[51] Int. Cl.² **A61B 5/04**

[58] Field of Search ..... 128/1 C, 1 R, 2.1 B, 128/2.1 R, 419 R, 422 R, 420, 404, 2 R, 2 S, 2.05 R, 2.05 V, 2.05 F, 2.06 R; 340/248 A, 258 A, 258 B, 258 D, 229

[56] **References Cited**

UNITED STATES PATENTS

2,860,627	11/1958	Harden et al.	128/2.1 B
3,096,768	7/1963	Griffith, Jr.	128/420
3,233,450	2/1966	Fry	128/2.1 R
3,483,860	12/1969	Namerow	128/2.05 F
3,495,596	2/1970	Condict	128/1 C
3,555,529	1/1971	Brown et al.	128/2.1 R
3,773,049	11/1973	Rabichev et al.	128/1 C
3,796,208	3/1974	Bloice	128/2 S

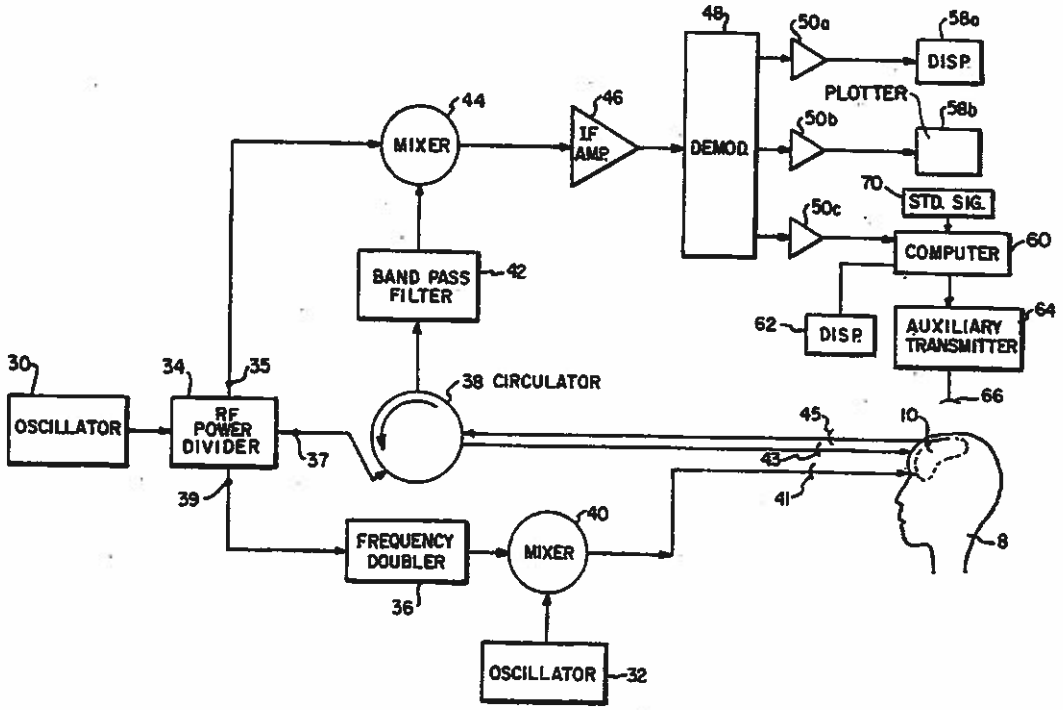
Primary Examiner—William E. Kamm

Attorney, Agent, or Firm—Darby & Darby

[57] **ABSTRACT**

Apparatus for and method of sensing brain waves at a position remote from a subject whereby electromagnetic signals of different frequencies are simultaneously transmitted to the brain of the subject in which the signals interfere with one another to yield a waveform which is modulated by the subject's brain waves. The interference waveform which is representative of the brain wave activity is re-transmitted by the brain to a receiver where it is demodulated and amplified. The demodulated waveform is then displayed for visual viewing and routed to a computer for further processing and analysis. The demodulated waveform also can be used to produce a compensating signal which is transmitted back to the brain to effect a desired change in electrical activity therein.

11 Claims, 2 Drawing Figures



US005507291A

United States Patent [19]

Stirbl et al.

[11] Patent Number: 5,507,291

[45] Date of Patent: Apr. 16, 1996

[54] METHOD AND AN ASSOCIATED APPARATUS FOR REMOTELY DETERMINING INFORMATION AS TO PERSON'S EMOTIONAL STATE

[76] Inventors: Robert C. Stirbl, 247 Wadsworth Ave., New York, N.Y. 10033; Peter J. Wilk, 185 W. End Ave., New York, N.Y. 10023

[21] Appl. No.: 222,835

[22] Filed: Apr. 5, 1994

[51] Int. Cl.[6] A61B 5/04

[52] U.S. Cl. 128/653.1; 128/661.08; 128/691; 128/745; 128/660.02

[58] Field of Search 128/653.1, 660.01, 128/660.02, 661.08, 691, 736, 745, 664

[56] References Cited

U.S. PATENT DOCUMENTS

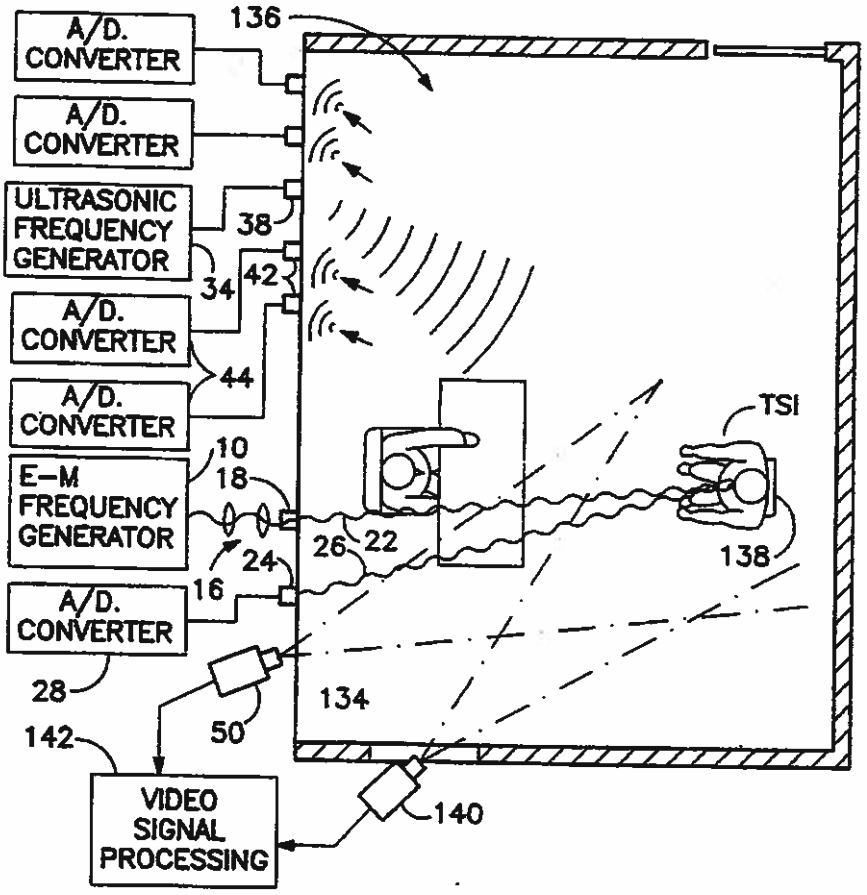
3,483,860	12/1969	Namerow	128/653.1
3,598,107	8/1971	Ishikawa et al.	128/653.1
3,875,929	4/1975	Grant	128/653.1
3,951,134	4/1976	Malech	128/653.1
3,993,995	11/1976	Kaplan et al.	128/653.1
4,048,986	9/1977	Ott	128/653.1
4,085,740	4/1978	Allen, Jr.	128/653.1
4,365,637	12/1982	Johnson	128/734
4,509,531	4/1985	Ward	128/736
4,556,057	12/1985	Hiruma et al. .	
4,569,354	2/1986	Shapiro et al. .	
4,981,139	1/1991	Pfohl .	
4,991,585	2/1991	Mawhinney	128/653.1
4,998,533	3/1991	Winkelman	128/653.1
5,022,405	6/1991	Hök et al. .	
5,099,852	3/1992	Meister et al.	128/691
5,137,027	8/1992	Rosenfeld	128/745
5,305,748	4/1994	Wilk .	
5,360,005	11/1994	Wilk	128/653.1

Primary Examiner—Krista M. Zele
Attorney, Agent, or Firm—R. Neil Sudol; Henry D. Coleman

[57] ABSTRACT

In a method for remotely determining information relating to a person's emotional state, an waveform energy having a predetermined frequency and a predetermined intensity is generated and wirelessly transmitted towards a remotely located subject. Waveform energy emitted from the subject is detected and automatically analyzed to derive information relating to the individual's emotional state. Physiological or physical parameters of blood pressure, pulse rate, pupil size, respiration rate and perspiration level are measured and compared with reference values to provide information utilizable in evaluating interviewee's responses or possibly criminal intent in security sensitive areas.

33 Claims, 4 Drawing Sheets



US006011991A

United States Patent [19]

Mardirossian

[11] Patent Number: 6,011,991

[45] Date of Patent: Jan. 4, 2000

[54] **COMMUNICATION SYSTEM AND METHOD INCLUDING BRAIN WAVE ANALYSIS AND/OR USE OF BRAIN ACTIVITY**

[75] Inventor: **Aris Mardirossian**, Germantown, Md.

[73] Assignee: **Technology Patents, LLC**, Derwood, Md.

[21] Appl. No.: **09/206,365**

[22] Filed: **Dec. 7, 1998**

[51] **Int. Cl.**[7] **A61N 5/00**

[52] **U.S. Cl.** **600/544**; 600/545

[58] **Field of Search** 600/300, 544–545; 128/897–898, 904, 905

[56] **References Cited**

U.S. PATENT DOCUMENTS

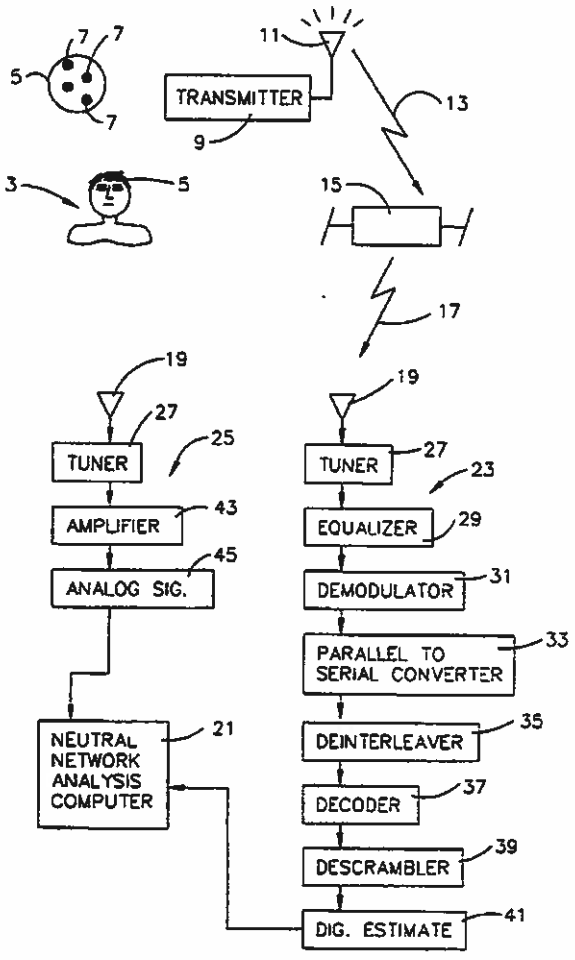
5,059,814	10/1991	Mead et al. .	
5,118,606	6/1992	Lynch et al. .	
5,136,687	8/1992	Edelman et al. .	
5,224,203	6/1993	Skeirik .	
5,303,705	4/1994	Nenov .	
5,325,862	7/1994	Lewis et al. .	
5,461,699	10/1995	Arbabi et al. .	
5,522,863	6/1996	Spano et al. .	
5,640,493	6/1997	Skeirik .	
5,715,821	2/1998	Faupel .	
5,719,561	2/1998	Gonzales .	
5,722,418	3/1998	Bro	128/905
5,730,146	3/1998	Itil et al.	600/544
5,736,543	4/1998	Rogers et al. .	
5,737,485	4/1998	Flanagan et al. .	
5,747,492	5/1998	Lynch et al. .	
5,791,342	8/1998	Woodard	600/544
5,816,247	10/1998	Maynard .	

Primary Examiner—Cary O'Connor
Assistant Examiner—Michael Astorino
Attorney, Agent, or Firm—Joseph A. Rhoa

[57] **ABSTRACT**

A system and method for enabling human beings to communicate by way of their monitored brain activity. The brain activity of an individual is monitored and transmitted to a remote location (e.g. by satellite). At the remote location, the monitored brain activity is compared with pre-recorded normalized brain activity curves, waveforms, or patterns to determine if a match or substantial match is found. If such a match is found, then the computer at the remote location determines that the individual was attempting to communicate the word, phrase, or thought corresponding to the matched stored normalized signal.

8 Claims, 3 Drawing Sheets



Low-Intensity Conflict and Modern Technology

LT COL DAVID J. DEAN, USAF
Editor

With a Foreword by
CONGRESSMAN NEWT GINGRICH

Air University Press
Center for Aerospace Doctrine, Research, and Education
Maxwell Air Force Base, Alabama

June 1986

5. Electroanesthesia.
6. Electroconvulsive therapy
7. Behavior modification in animals.
8. Altered electroencephalograms in animals and humans.
9. Altered brain morphology in animals.
10. Effects of acupuncture.
11. Treatment of drug addiction.
12. Electrostimulation for relief of pain.
13. Altered firing of neuronal cells.

These are but a few of the many biological effects and uses that have been reported over the past decade. They are not exhaustive and do not include many of the effects reported in the Soviet and East European literature.

As with most human endeavors, these applications of electromagnetic radiation have the potential for being a double-edged sword. They can produce significant benefits, yet at the same time can be exploited and used in a controlled manner for military or covert applications. This paper focuses on the potential uses of electromagnetic radiation in future low-intensity conflicts.

POTENTIAL MILITARY APPLICATIONS OF EMR

The exploitation of this technology for military uses is still in its infancy and only recently has been recognized by the United States as a feasible option. A 1982 Air Force review of biotechnology had this to say:

> Currently available data allow the projection that specially generated radiofrequency radiation (RFR) fields may pose powerful and revolutionary antipersonnel military threats. Electroshock therapy indicates the ability of induced electric current to completely interrupt mental functioning for short periods of time, to obtain cognition for longer periods and to restructure emotional response over prolonged intervals.
>
> Experience with electroshock therapy, RFR experiments and the increasing understanding of the brain as an electrically mediated organ suggested the serious probability that impressed electromagnetic fields can be disruptive to purposeful behavior and may be capable of directing and/or interrogating such behavior. Further, the passage of approximately 100 milliamperes through the myocardium can lead to cardiac standstill and death, again pointing to a speed-of-light weapons effect.
>
> A rapidly scanning RFR system could provide an effective stun or kill capability over a large area. System effectiveness will be a function of wave form, field intensity, pulse widths, repetition frequency, and carrier frequency. The system can be developed using tissue and whole animal experimental studies, coupled with mechanisms and waveform effects research.
>
> Using relatively low-level RFR, it may be possible to sensitize large military groups to extremely dispersed amounts of biological or chemical agents to which the unirradiated population would be immune.[1]

light has been used in clinical medicine to transilluminate various body tissues. The technique is particularly useful in observing the skulls of infants and the various sinus cavities.

A second area where classical theory fails to provide an adequate explanation for observed effects is in the clinical use of extremely low frequency (ELF) electromagnetic fields. Researchers have found that pulsed external magnetic fields at frequencies below 100 hertz will stimulate the healing of nonunion fractures, congenital pseudarthroses, and failed arthroses.[3] The effects of these pulsed magnetic fields have been extremely impressive and their use in orthopedic conditions has been approved by the Food and Drug Administration.

Recently, pulsed electromagnetic fields have been reported to induce cellular transcription.[4] At the other end of the nonionizing spectrum, research reports are also showing biological effects that are not predicted by classical theories. For example, Kremer and others have published several papers showing that low-intensity millimeter waves produce biological effects. They have also shown that not only are the effects seen at very low power, but they are also frequency specific.[5]

TABLE 2-4

Characteristics of Electromagnetic Wave Propagation in Tissues of High Water Content: Represented by Muscles and Skin at Various Frequencies

Frequency MHz	Wavelength Air Tissue cm	Depth of Penetration cm	Dielectric Constant	Conductivity mho/cm	Reflection Coefficient at Interface	
					Air:Muscle	Muscle:Fat
100	300 [illegible]	[illegible]	[illegible]	0.889	0.881 −175	0.650 −7.96
200	150 16.6	[illegible]	56.5	1.28	0.844 −175	0.612 −8.06
300	100 11.1	[illegible]	54	1.37	0.825 −175	0.592 −8.14
433	[illegible]	[illegible]	53	1.43	0.803 −175	0.562 −7.06
750	40 5.32	[illegible]	52	1.54	0.779 −176	0.532 −5.69
915	32 [illegible]	[illegible]	51	1.60	0.772 −177	0.519 −4.32
1,500	20 2.81	2.22	49	1.77	0.761 −177	0.506 −3.66
2,450	12 2.1 76	1.70	47	2.21	0.754 −177	0.500 −3.88
3,000	[illegible]	1.61	46	2.26	0.751 −178	0.495 −3.20
5,000	[illegible]	[illegible]	44	3.92	0.749 −177	0.502 −4.95
5,800	5.17 0.775	0.720	43.3	4.73	0.746 −177	0.502 −4.29
8,000	3.75 0.57	0.513	40	7.65	0.744 −176	0.513 −6.65
10,000	3 0.464	0.343	39.9	10.3	0.743 −176	0.518 −5.95

Source: S. Baranowski and [illegible]

of chaotic behavior in chicken heart cells when stimulated by electrical signals at specific frequencies and amplitudes.[3] It has also been shown that normal breathing takes place at certain frequencies and amplitudes, but not at others. Animals forced to breathe at certain unnatural frequencies develop severe respiratory distress.

This past year, Dr Adey has evaluated a Soviet LIDA medical instrument that has been claimed to induce sleep. The instrument can produce pulsed sound, light, heat, and electromagnetic energy. The four modalities can be used all together, singly, or in any combination of the four. Soviet medical literature contains claims that the use of the instrument will benefit "inorganically caused neuropsychic and somatic disorders, such as neuroses, psychoses, insomnia and hypertension." Their concept of what is "inorganic" is questionable and why they seem to relate hypertension with neuroses and psychoses is unknown.

According to Dr Adey's report, electromagnetic fields may induce a slower rate of state transitions in cats. The electromagnetic field alone was capable of prolonging particular sleep states. The efficacy of the EM field alone to prolong a sleep state was less than when combined with either visual or auditory stimuli. The use of visual and auditory stimuli without the electromagnetic field also shifted sleep patterns to deeper levels, but did not alter rates of state transitions. Dr Adey felt that there may be a synergistic action between the electromagnetic field and the rhythmic sensory stimuli to achieve sustained states at one sleep level—a condition that was not present when any single stimulus was delivered alone.[11]

The instrument used in the Soviet experiments was considered to be of 1950s technology, using a self-excited oscillator and vacuum tubes. The center frequency was 40 megahertz, but harmonic and spurious radiations in excess of 1 gigahertz were noted. The pulse duration was 0.3 seconds with a repetition rate of 10 to 100 pulses per minute. Reports in the literature state that many newer and more effective models have been developed.

In a recent paper, Ubeda, Delgado, and others reported that the pulse shape of a pulsed magnetic field has an influence upon the development of chick embryos.[4] They reported that using four different-shaped pulses resulted in differing effects on the embryos. The first signal had a rise time of 100 microseconds with a declining plateau. The second signal was basically a square wave with a rise time of 2 microseconds. The third had a rise time of 42 microseconds with a secondary modulation throughout the signal. The fourth signal also had a rise time of 42 microseconds without the superimposed modulation. All pulses had a 500-microsecond duration and a repetition rate of 100 hertz. The results showed that some wave forms interfered with embryogenesis while others did not. A windowing effect was also noted with the exposure intensities: some effects were noted at low intensities but not at higher intensities.

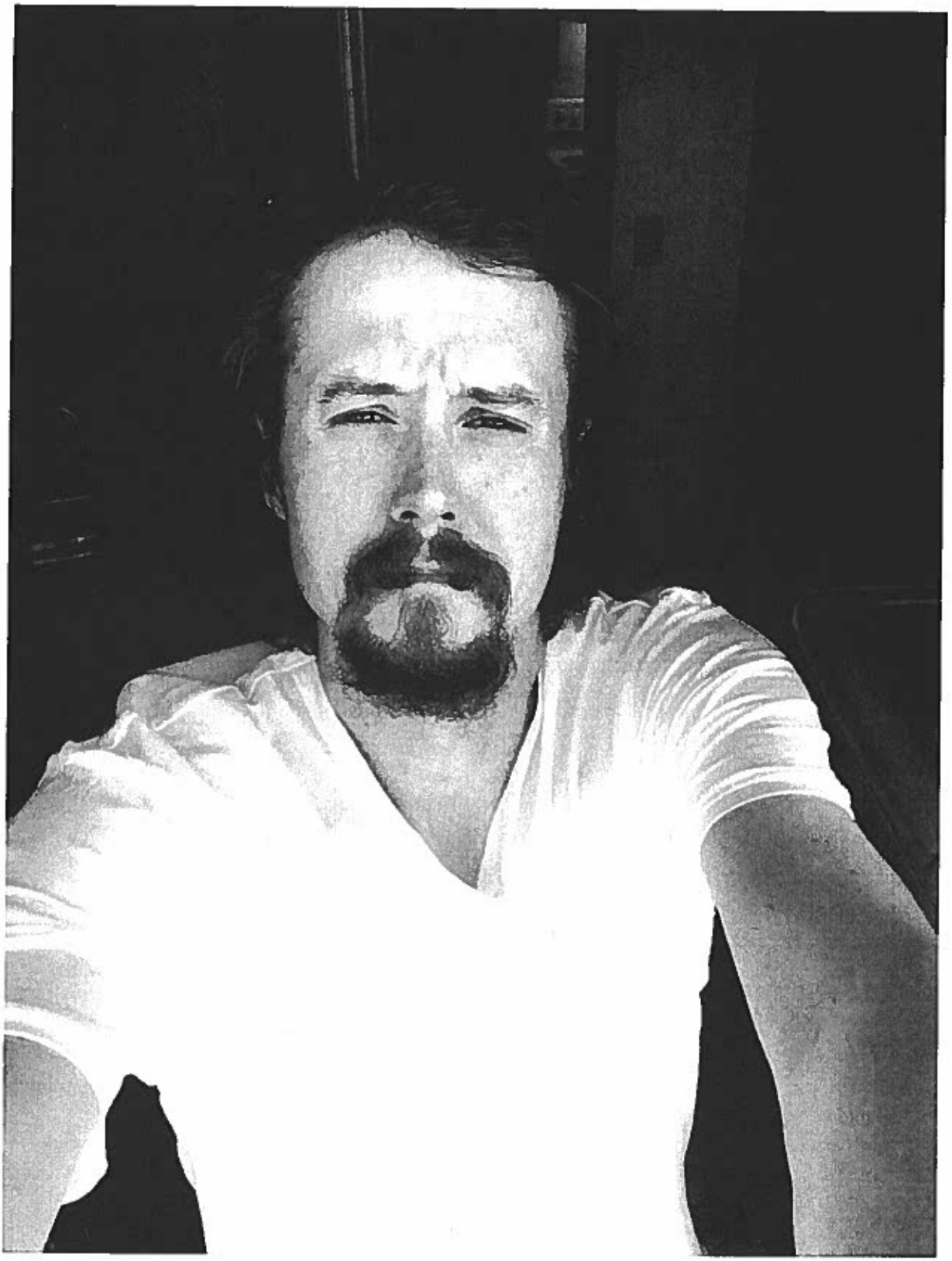
Windowing of both frequency and power amplitude have also been reported by other investigators.[5] This phenomenon was first reported by Adey and his coworkers in the early seventies, but until recently has not been widely accepted as an important parameter. The specific wave form and windowing of both the

be taking place rather than events envisioned in the classical chemical concept: The action potential descends down the axion and produces a bias across the synaptic junction, which then induces electron tunneling in the reverse direction, which in turn causes a confirmational change in the vesicules. This confirmational change causes the vesicules to release their neurotransmitter. This mechanism also involves leakage currents from nearby neurons and perineuronal cells. The cells are "talking" to each other so that the system is far more complex than once thought. These quantum mechanical events, being statistical in nature and depending upon crosstalk from other cells instead of a pure internal electrical conductance within the single cell, infer that the complex system will be susceptible to external nonlinear electromagnetic influences. The disruption of neural pathways can lead to a multitude of effects. With today's sophisticated weapon systems, one does not have to totally disable individuals to render them ineffective for combat. For example, if their timing is altered or their cognitive processes are degraded these individuals may be unable to operate their equipment (fly their aircraft, make the proper decision with computer-operated systems, or successfully complete related action).

Because of the many parameters involved and the apparent specificity of each parameter, one can tailor a specific response. The ability to have this kind of flexibility provides an enormous range of options to the user. It opens the door for providing an appropriate response in warfare, be it conventional or unconventional. There are still many unanswered questions concerning this technology. To date, the vast majority of research done in this country has focused on using single frequency sources with standard parameters. No one has used multiple frequencies during a single exposure, nor has anyone tried to manipulate the parameters to produce biological effects. Up to the present time the majority of scientists in the United States have assumed that a "microwave is a microwave," and research done at one frequency would be applicable to any frequency in the same region. We now know that the experiment must be frequency specific, but how specific? Does this change for various portions of the electromagnetic spectrum? There are unconfirmed reports that a change of .01 hertz can make a difference. Most scientists still do not believe that this small a change in frequency will make a difference. Yet, Rapp has shown that a frequency-encoded signal can act as a trigger for the release of amylase from the salivary glands of the blowfly (Calliphora exythocephalla). The variation in the frequency that modified the release of the enzyme was from 0.00 hertz to 0.056 hertz. In this study the stimulus was the chemical 5-hydroxytryptaime. What is of particular interest is that the original chemical interaction was converted to a digital frequency oscillation. The general reaction was analog to digital and back to analog.[18] A fundamental question is, could the same response be obtained by bypassing the initial chemical (analog) input and stimulate the cell directly with and electromagnetic signal at these same frequencies. The results of this experiment certainly indicate that a narrow specific frequency may be required to obtain specific results.

Contrary to the Soviets' materialistic approach to this area and their utilization of electromagnetic radiation as an explanation for all such events, it is doubtful that

separated from classical mechanics. A similar solution will, on a smaller scale, apply to the investigation into the properties of the atomic nucleus, which occupies the center of interest in contemporary physics. The edifice of exact science can hardly be looked upon as a consistent and coherent unit in the naive way we had hoped. Simply following the prescribed route from any given point will not lead us to all other rooms of this building: for it consists of specific parts, and though each of these is connected to the others by many passageways and each may encompass some others or be encompassed by others, nevertheless each is a unit complete in itself. The advance from the parts already completed to the newly discovered, or to be newly erected, demands each time an intellectual jump, which cannot be achieved through the simple development of already existing knowledge.[19]



In a hearing before the Foreign Affairs Subcommittee of the European Parliament,[205] the issue of these new technologies was discussed. I was one of those called to testify along with a number of other people. One of the most interesting speakers was from the International Red Cross in Geneva, Switzerland, who gave an excellent presentation on "non-lethals." One of the points which he made involved the definition of "non-lethal." Part of the definition involved the idea that such weapons would result in a less than 25% kill factor for those exposed to them. He explained the fallacy in this by noting that land mines would even fit this definition because they did not kill over 25% of their victims. He explained that lasers which could permanently blind a person could also fit the definition. He also gave the example of "sticky foam" being used on an adversary and that this might not kill the person unless it landed on the victim's face and caused a slow and agonizing death by suffocation. The main point made was that non-lethals could indeed be lethal. Many of the panelists concluded that the term non-lethal was not accurate in describing these new systems and seemed more like a ploy to gain acceptance for the new technology.

Another relevant point made in the hearing was the frequency of use of these weapons in non-combat situations or policing actions. Comparisons between Bosnia and Northern Ireland were made. It was pointed out that in conflicts where rubber bullets and other non-lethal systems were available they tended to be used with greater frequency because the troops using them believed that they would not kill. Others in conflict situations using weapons clearly designed for killing used much greater restraint. In several years "peace keepers," armed with modern weapons, had not fired a shot in Bosnia whereas in Northern Ireland there were often injuries and deaths from the use of "non-lethals."

What to do with the "Peace Dividend?"

According to some, there is no peace dividend worth saving. The hawkish statements of some leaders shows their desire to turn the savings into a quiet arms race nobody knows they are in. "These already-paid-for technologies – according to a can-do letter written last year by Newt Gingrich, who has followed his futurist mentor, Toffler, onto the nonlethals bandwagon – 'are our real peace dividend.' Nonlethal weapons, Gingrich added, will 'preserve the defense industrial base, stimulate jobs in high-technology industry, and provide needed new options to local police and law enforcement authorities.'"[206] Congressman Gingrich was an advocate for these technologies for years, having written the foreword for *Low Intensity Conflict and Modern Technology* as far back as 1986. That particular document set the stage for many of the new and emerging

205. February 6, 1998, Brussels, Belgium. European Parliament's Foreign Affairs Subcommittee on Security and Disarmament. EPI715
206. Shorto, Russell. "Armageddon: Killing Them Softly." *GQ*. March 1995. EPI390

technologies. During Congressman Gingrich's watch, the merging of the Defense and Justice Departments' efforts in the development and use of these new weapons took place.

While officials still show a fascination for the gadgetry of war, the creation of more sinister technology continues to advance. "Quantico Marine Base, home of the Pentagon's Joint Non-Lethal Weapons Program, hosted the first annual Non-Lethal Technology and Academic Research Symposium. In attendance were U.S. senators, marines, professors, defense vendors, and police officers. Defense vendors displayed high-tech non-lethal weapons, including sound wave and beam devices designed to temporarily disable suspects. Another interesting addition was the $220,000 SARGE, or Surveillance and Reconnaissance Ground Equipment, which is an all-terrain robot with infrared cameras that fires bean bags and smoke rounds at targets."[207]

The Future of War

The Council on Foreign Relations (CFR) made some interesting observations which are quickly being integrated into the military strategy framework. Part of this new thinking includes the ability to make war without declarations or detection. The ability to wage war without detection should be cause for great concern on the part of our allies as well as adversaries. Who will determine when, or even if, the public would be alerted to the conflict or its implications? The CFR makes the following points:

> "U.S. restraint will not prevent development of all non-lethal weapons by others. Russia, the United Kingdom, France, Italy, and Israel are said to have made significant efforts to develop non-lethal capabilities. Some non-lethal weapons can be assembled from components commercially available to terrorists as well as to governments. Research and development of non-lethal technologies will contribute to knowledge of defenses and antidotes. Some research and perhaps deployment should be undertaken in secret, both to attempt to limit proliferation and to retain the benefits of surprise.
>
> The Nairobi Convention, to which the United States is a signatory, prohibits the broadcast of electronic signals into a sovereign state without its consent in peacetime. Of course the contemporary world provides many situations between full peace and all-out war. The concept of a 'declaration of hostilities' or of a 'failed state' may be appropriate in such circumstances, not only with regard to the use of electronic signals but to the use of enhanced sanctions and non-lethal weapons as well.

207. Vogel, Steve. "Trained Not To Kill." *Washington Post*, May 6, 1999. Source: NLECTC *Law Enforcement & Technology News Summary*, May 13, 1999. EPI971

enemy clan, can be death. The possibility of a SOF precision operations team, being able to infiltrate into an enemy target area, apply a predetermined or tunable level of lethality to enemy personnel simply by touch, would minimize the need for additional support equipment and weapons – thus, allowing the forces to blend into the cultural environment.

HVA Recovery (Targeting the System Process): A special operations team should have the capability to walk into a roomful of individuals, and within a split-second neutralize all the bandits, sort all the bogeys (presenting appropriate decision making data to all precision team members), and exclude all the friendlies. Primary use for this capability would be in hostage rescue.

To provide this level of coverage requires advances in two areas, first the sensory/display area and then the fire control/weapons system. The sensory array could be tuned for target ID via DNA sensing, or possibly a form of pheromone sensing like that of pre-covert target marking, or as simple as those individuals with weapons are bad and all others require further forms of interrogate. These sensory inputs could then be filtered and combined with other team-gathered information, near instantaneously, and displayed within the visor of an ultimate warrior targeting helmet or a modified tactical information display helmet. Of course, the sensory/ targeting system must operate in all light conditions and weather environments. The targeting data then is instantly fed to a hand-held slaved weapons system which will appropriately target the captors.

Ether Targeting (Ether): The ether targeting environment also drives needs for peculiar skills and equipment. Specifically, adversaries will certainly avail themselves of high-fidelity sniffers and sensors to detect net invasion. By 2025, electrons will be identifiable as DNA strands allowing individuals to detect, identify, and target particular trans-missions for manipulation. Unlike most warfare, cyberwar and commercial war open Pandora's box – defining truth."210

"Defining truth," is the real issue behind infowar and the development of new technologies which merge in a manner which can lead to easy manipulation of visual images, voice recordings and even direct interference with mental functions. The ability to change the very essence of reality becomes possible when those in control have the ability to synthesize any thought, emotion, or the more obvious – the media's reports.

210. Cemiglia, Col. James A. *The Dim Mak Response of Special Operations Forces to the World of 2025.* Air Force 2025, Aug. 1996. EPI670

Terrorists

Fear has become the central theme in the drive for more sophisticated kill systems. Terrorists and narcotraffickers remain high on the list of villains we must guard against, according to military planners and research laboratories.

On the civilian side the fear is being converted to cash. Michael Stedman, president of the Wellesley, Mass., ethical intelligence consulting firm Business Intelligence Network Systems, predicts now that the United States has adopted counterterrorism as a major policy concern, armored vehicle companies will enjoy a boost in sales. One such company is O'Gara-Hess & Eisenhardt Armoring Co. (OGH&E) of Fairfield, Ohio. Owner Bill O'Gara says that in the early 1990s, the company sold about two cars a year to corporate customers, and now sells several hundred a year. OGH&E offers vehicles with varying degrees of protective armoring and other security features. In addition, the firm supplies the U.S. Army and Air Force with 600 up-armored Humvees."211

The fear factor is also played up in weapons of mass destruction (WMD) scenarios. "A significant concern for the U.S. is the psychological fear of a WMD attack (e.g., April 24 package in [Washington] D.C.) The anxiety generated by such fear may pose far more difficult problems than the physical threat itself. The public must be made aware of the many limitations of the WMD threat and that there are ways to respond effectively, which their local authorities are developing."212 "As a venue for infliction of pain, terrorists have long favored mass transit. Their focus has shifted, however, from international airliners to domestic rail and bus systems. Thus, combating terrorism has become especially problematic due to increased involvement from disparate agencies, including law enforcement, emergency services, structural engineers, and heavy equipment operators. Fortunately, numerous cities nationwide have begun preincident planning and extensive interagency training to circumvent this disability."213 Meanwhile, "Attorney General Janet Reno trumpeted a new FBI office that will offer local police, fire and rescue workers one-stop shopping for federal training and equipment to respond to chemical, biological or nuclear attacks by terrorists."214 And, "On April 30, 1998, the Attorney General delegated authority to the Assistant Attorney General for the Office of Justice Programs (OJP) to administer grants to assist state and local public safety personnel in acquiring the specialized equipment and training necessary to safely respond to and manage domestic terrorist activities,

211. Stedman, Michael. "U.S. Counter-terrorism Policy Boosts Prospects for Armored Cars." *Security, Technology & Design*, April 1999. Vol. 26, No. 4. Source: NLECTC *Law Enforcement & Technology News Summary*, May 13, 1999. EPI975

212. *Defense Issues.* "Defending America Against New Breed of Terror." Vol. 12, No. 31. http://www.defenselink.mil/speeches/1997/s19970428-holmes.html EPI360

213. Nelson, Kurt R. "Mass Transit: Target of Terror." *FBI Law Enforcement Bulletin*, Jan. 1999. Vol. 68, No. 1. Source: NLECTC *Law Enforcement & Technology News Summary*, Feb. 18, 1999. EPI1028

214. Sniffen. Michael J. "FBI Opens New Anti-Terrorist Office." *Newsday.com*, Oct. 16. 1998. http://www.newsday.com/ap/mmpwh1v.htm EPI1146

independent evaluation of its biomedical effects is undertaken. Special Agent Ward, the FBI officer who cleared OC in the USA was found to have taken a $57,000 kickback to give it the OK. Other US military scientists warned of dangerous side effects including neurotoxicity and a recent estimate by the International Association of Chief Police Officers suggested at least 113 peppergas linked fatalities in the US – predominately from positional asphyxia. Amnesty International has said that the use of pepper spray by Californian police against peaceful environmental activists, is 'cruel, inhuman and degrading treatment of such deliberateness and severity that it is tantamount to torture.' (Police deputies pulled back protestors heads, opened their eyes and 'swabbed' the burning liquid directly on to their eyeballs).

In the early Nineties, much to the disbelief of serious researchers, a new doctrine emerged in the US – non-lethal warfare. Its advocates were predominately science fiction writers such as (Toffler, A., & Toffler, H., 1994) and (Morris, J., & Morris, C. 1990, 1994), who found a willing ear in the nuclear weapons laboratories of Los Alamos, Oak Ridge and Lawrence Livermore. The cynics were quick to point out that non-lethal warfare was a contradiction in terms and that this was really a 'rice-bowls' initiative, dreamt up to protect jobs in beleaguered weapons laboratories facing the challenge of life without cold war.

This naive doctrine found a champion in Col. John Alexander (who made his name in the rather more lethal Phoenix assassination programs of the Vietnam War) and subsequently picked up by the US Defense and Justice Departments. After the controversial and overly public beating of Rodney King (who was subdued by 'an electroshock 'taser' before being attacked); the excessive firepower deployed by all sides in the Waco debacle (where the police used chemical agents which failed to end the siege); and the humiliations of the US military missions in Somalia – America was in search of a magic bullet which would somehow allow the powers of good to prevail without being hurt. Yet US doctrine in practice was not that simple, it was not to replace lethal weapons with 'non-lethal' alternatives but to augment the use of deadly force, in both war and 'operations other than war', where the main targets include civilians. A dubious Pandora's box of new weapons has emerged, designed to appear rather than be safe. Because of the 'CNN factor' they need to be media friendly, more a case of invisible weapons than war without blood. America now has an integrated product team consisting of the US Marines, US Air Force, US Special Operations Command, US Army, US Navy, DOT, DOJ, DOE, Joint Staff, and CINCS Office of Sec.Def. Bridgeheads

for this technology are already emerging since one of the roles of this team is to liase with friendly foreign governments.

Last year the interim report advised that the Commission should be requested to report on the existence of formal liaison arrangements with the US, for introducing advanced non-lethal weapons into the EU. The urgency of this advice was highlighted in November 1997 for example, when a special conference on the 'Future of Non-Lethal Weapons', was held in London. A flavor of what was on offer was provided by Ms. Hildi Libby, a systems manager of the US Army's Non-lethal Material Program.

Ms. Libby described the M203 Anti-personnel blunt trauma crowd dispersal grenade, which hurtles a large number of small 'stinging' rubber balls at rioters. The US team also promoted acoustic wave weapons that used 'mechanical pressure wave generation' to 'provide the war fighter with a weapon capable of delivering incapacitating effects, from lethal to non-lethal'; the non-lethal Claymore mine – a crowd control version of the more lethal M18A1; ground vehicle stoppers; the M139 Volcano mine which projects a net (that can cover a football sized field) laced with either razor blades or other 'immobilization enhancers' – adhesive or sting; canister launched area denial systems; sticky foam; vortex ring guns – to apply vortex ring gas impulses with flash, concussion and the option of quickly changing between lethal and non-lethal operations; and the underbarrel tactical payload delivery system – essentially an M16 which shoots either bullets, disabling chemicals, kinetic munitions or marker dye.

One of the unanticipated consequences of these weapons is that they offer a flexible response which can potentially undermine non-violent direct action. Used to inflict instant gratuitous punishment, their flexibility means that if official violence does tempt demonstrators to fight back, the weapons are often just a switch away from street level executions.

New Prison Control Systems: Apart from mechanical restraint, prison authorities have access to pharmacological approaches for immobilizing inmates, colloquially known as 'the liquid cosh.' These vary from psychotropic drugs such as anti-depressants, sedatives and powerful hypnotics. Drugs like Largactil or Seranace offer a chemical strait-jacket and their usage is becoming increasingly controversial as prison populations rise and larger numbers of inmates are 'treated'. In the USA, the trend is for punishment to become therapy: 'behavior modification' – Pavlovian reward and punishment routines using drugs like anectine, producing fear or pain, to recondition behavior. The possibilities of testing new social

the environment.'"232 Sounds good. "Imagine a world where land mines don't blow up but give off an eerie sound that makes intruders feel sick. Or a war where attackers don't use missiles to stop tanks but microwaves to shut down engines."233

The Air Force is only one organization which is pursuing the technology but they seem to publish the best material for those of us interested in this area of research. In one recent document a great deal is revealed:

> "How would we employ this nonlethal technology? We should use it early in a conflict and in such a way that targeted leaders are unaware of its application. The objective of this strategy would be to disrupt leadership to such an extent that it would reconsider going to war. Innovative weapons and approaches for conducting these types of operations offer opportunities to apply the military instrument of power and stop a potential outbreak of war. By using technology to get into the enemy's networks, we could use electronic bullets from a remote site to destroy specific components of the regime's command and control equipment. Nonlethal weapons for attacking electricity already exist in the U.S. arsenal. Also at our disposal are microbes or chemicals that alter petroleum products, rendering them useless. One can effectively disrupt most of a nation's transportation system through nonlethal means. Airpower could drop microbes or chemical agents on roads and airports to ruin them or to damage the rubber tires of vehicles that use the roads. We could drop different agents or caustics on rail lines to deteriorate the lines or to prevent train cars from generating the friction they need to move. We could also affect the economic infrastructure by infiltrating the state's electronic financial network and causing general economic chaos among the government and its people.
>
> In addition to cost considerations, several other factors justify the incorporation of nonlethal weapons into our military arsenal: public opinion, the media, and dual use technology. Public opinion shapes the decisions of America's leadership regarding armed conflict. Because nonlethal warfare limits bloodshed, it will be endorsed by the American public as a positive approach for conducting future wars. In an age of instant communication, capabilities available to the media have an increasingly important impact on military operations. The media serves as a conduit of information not only to the American public, but also to the rest of the world. We need to eliminate the notoriety associated with war. If we use nonlethal technology to achieve paralysis, eliminate

232. Coppernoll, Lt. Col. Margaret-Anne. "The Nonlethal Weapons Debate." http://www.nwc.navy.mil/press/review/1999/spring/art5-sp9.htm EPI248
233. Raphael, Michael. "Future Weapons may avert deaths." *Anchorage Daily News.* EPI48

unintentional killing, and erase signs of visible destruction, then perhaps in some situations we can rid the news of sensationalism. Without a riveting story to tell, the media may be silenced. One last advantage of nonlethal warfare is its applicability to the civilian sector. Developing these weapons with a dual use in mind will greatly assist the efforts of our law enforcement communities. Currently, little is available to law enforcement short of deadly force. A means of safely subduing a suspect without using deadly force would be a significant addition to the war on crime. Such uses of nonlethal weapons are endless. Drug interdiction, border patrols, antiterrorism and riot control are good examples.

Most of the near term work with nonlethal weapons will continue to be geared to antimateriel uses. However, current treaties must be renegotiated to take into account other nonlethal technologies. Certain chemical and biological uses of nonlethal technology may be acceptable, given the nonlethal aspects of their use. Although international agreements currently proscribe the use of chemical or biological warfare in water and food supplies, these agreements came at a time when offensive chemical and biological warfare sought to kill the enemy. New forms of chemicals and microbes would not kill; instead they would merely have a temporary effect on the population and conceivably could save lives by averting combat. Such weapons most likely would be in chemical or biological form. Chemicals placed in the water could indirectly affect agriculture and population by discoloring the water to make it appear undrinkable, slowing crop growth, or even temporarily altering the mental states of potential enemies. Clearly, we must address the incapacitation of humans and the moral dilemma that surrounds this emotional issue.

Another controversial issue is the use of mind altering drugs to influence the population of enemy states. According to Dr. Stuart Yudofsky of Baylor University, psychopharmacology (the science of drugs that affect the mind) is on the brink of revolution.' Previously, psychopharmacology has concentrated on the development of drugs that modify the brain chemistry of mentally ill patients, which led to the development of drugs such as Prozac during the late 1980s. Recently, scientists are studying 'normal' brains and determining which chemicals cause certain personality traits. Imminent breakthroughs in this area will lead to the possibility of made-to-order, off-the-shelf personalities.' Additionally, the new drugs are supposed to have no serious side effects and no addictive properties. Potentially, psychopharmacology has great application for nonlethal warfare and should be followed closely to ensure that its offensive and defensive

restricted area. EMP sea mines may be employed in the restricted area to deter any maritime traffic. The port activities can be disrupted via air-launched EMP weapons to disable electronic components of infra-structure equipment and the electronic ignition of transportation vehicles at selected port areas."[242]

Not Just for the Military
Police Like Them Too!

The following was taken from the United States Department of Justice's report on the increased use of new technology. As these words are written, the authors note that many of these earlier reports have resulted in the development and deployment of these systems by 1999.

"U.S. Department of Justice, National Institute of Justice, Office of Communication and Research Utilization. Report on the Attorney General's Conference on Less Than Lethal Weapons" by Sherri Sweetman, March 1987

Basically, two distinct categories of less than lethal weapons would be useful in crowd control: one to control major groups of people, and another to deal with individual instigators.

Participants also discussed the use of various wave lengths and forms of administration of electromagnetic energy as a non-lethal weapon. A substantial amount of preliminary research has been conducted in this area. Flashing or stroboscopic light has been found to produce a disorienting effect (termed photic driving or photic stimulation) at frequencies close to the alpha rhythm of the brain (12.5 cycles per second in most people). Stroboscopic light at exactly that frequency will induce seizures in approximately 1.5 percent of the population. One conference delegate reported testing 100 subjects, using flashing light near but not at the alpha rhythm frequency. Discomfort or disorientation was produced with an intensity of light down to 4 cycles per second, and the effect was still produced when the light was introduced from the side or through closed eyelids. A sharp leading edge to the waveform was found to be more effective than a round waveform.

The effect of stroboscopic light has been studied by a number of groups. In military applications, for instance, pulsed strobes in open terrain were found to cause disorientation, stumbling, and inability to concentrate. The

242. Ibid.

disorienting effect produced by light flashing at an appropriate frequency is not limited to nighttime. Sunlight filtering through helicopter rotors has also been reported to produce nausea or seizures. Reflected light and closed eyelids do not negate the effect. Lights flashing on airplanes at night may also produce disorientation. The fact that the brain can be severely affected by optic stimulation of a specific type offers clear possibilities for the development of less than lethal weapons – in particular those designed for crowd control (where it should be possible to protect law enforcement personnel from the effects of the light by means such as special protective glasses).

It is also quite likely that certain human physiological systems can be affected by exposure to various specific frequencies of electromagnetic radiation. One conference participant noted that scientific knowledge of human physiology is progressing to the point where it may soon be possible to target specific physiologic systems with specific frequencies of electromagnetic radiation to produce much more subtle and fine-tuned effects than those produced by photic driving. There is some evidence (and a good deal of supposition) that sustained, extremely low frequency (ELF) radiation can produce nausea or disorientation. One researcher has subjected animals to ELF electromagnetic radiation through electrode implants, and feels that similar results could be produced from afar, without electrodes. One participant suggested that ideally, one might like to develop the ability to design these electromagnetic fields for specialized use, for instance to produce sleep or confusion. It is known that sleep can be induced by electrodes in the brain, and Russian scientists claim to be able to produce sleep from afar (electrosleep).

Other frequencies may have significant impacts as well. It has been reported that a man who stepped in front of a microwave communications transmitter felt various disorienting effects. A participant suggested that in contrast to the long time periods that might be necessary (1/2 hour to 4 hours) to produce disorienting effects using ELF, other frequencies could potentially stun a person within 100 milliseconds. Needless to say, very careful and extended testing would be essential and the potential for irreversible physiological damage may be high. The damage may be far more subtle than that caused by a gun and, as a result, more difficult to detect, control and restrain.

It is easy to say that less than lethal weapons must be tested during the development process, but actually performing those tests is more difficult, because any weapons developed must be tested on animals, and eventually on human

Infrasound. This is a powerful ultralow frequency (ULF) sonic weapon that can penetrate buildings and vehicles and can be directional and tunable. As a weapon, infrasound, lowfrequency sound, entails the same concerns as high-intensity sound. After being exposed to highintensity infrasound, a subject suffers from disorientation and reduced ability to perform sensorymotor tasks. At elevated levels, experimental animals cease breathing temporarily. The principles and findings regarding highintensity sound would apply to infrasound. The suffering would be no greater than that experienced by conventional weapons. The suffering must be proportionate to the military objectives. The sound must be applied so that damage to noncombatants is incidental in light of the military objective.

Sonic Bullets. These are packets of sonic energy that are propelled toward the target. The Russians apparently have a portable device that can propel a 10-Hertz (Hz) sonic packet the size of a baseball hundreds of yards. When employed against humans, the energy can be selected to result in nonlethal or lethal damage. The sonic bullet uses direct sonic energy. If the energy can be controlled so that it is used only against lawful combatants, the concerns surrounding acoustical weapons may be reduced or eliminated.

Voice Synthesis. This is the ability to clone a person's voice and broadcast a synthesized message to a selected audience. The propaganda value of this technique in our highly media dependent world would be enormous. We currently have the ability to control the broadcasts of foreign radio and television stations by using orbiting platforms packed with electronic gear.

In considering whether it is legal to clone a person's voice in order to gain a military advantage, it is important to determine whose voice is being cloned. In most cases, it would be realistic to expect that the voice cloned would be that of a political leader or a military officer. The cloned voice might give orders to the enemy combatant that might prove detrimental to the combatant. The combatant would most likely be under an obligation to follow those orders. That obligation, however, is owed to his own chain of command and is not under the law of armed conflict. Treacherous acts, those which abuse an obligation to be truthful under the law of armed conflict, are illegal. But if there is no obligation to be truthful under the law of armed conflict, then the misinformation amounts to a lawful ruse.

Conventional Warfare. Nonlethal weapons can also be used in conventional conflicts. Electromagnetic pulse (EMP)

weapons can be used to disable grounded aircraft or vehicles rendering them useless on a temporary or even permanent basis. These weapons can also be used to down airborne aircraft although this would hardly be considered nonlethal One key to effective warfighting doctrine is to attack an enemy's critical nodes of command and communications as well as other infrastructures. While smart weapons can attack specific complexes and bunkers, nonlethal weapons offer the opportunity to disable entire nodes on a much grander scale. For example, the remote injection of a computer virus into an enemy's command and control system could be devastating. Likewise, certain biological agents that are designed to attack silicon or other computer components could effectively destroy computerized warfighting equipment. Super caustics can be sprayed on roads to deteriorate tank tracks and truck tires. Antitraction compounds can render mountain roads impassable, and embrittlement compounds could be sprayed on virtually any mechanical device – rendering them ineffective over a period of time. Combustion alteration technology agents could be used to shut down an entire harbor or airfield. Of course, practical matters such as method of delivery, persistence, concentration, and efficiency of these agents versus more lethal weapons must be considered."[251]

The use of these new technologies raises its own set of questions, particularly concerning the manipulation of media. The questions of national security again rub up against basic American values of the freedom of the press and communications generally. Granted that in wartime the rules are suspended, but the questions persist. Could it be asserted, for instance, that in peacetime the objectives of the government could be better served by silent interference with perceived enemies?

Some of the observations made by trying to get rid of birds on runways resulted in the development of, once again, dual use systems – in this case, against birds and humans. "Researchers are attempting to reduce aircraft-bird strikes by warning the birds away with an audible modulation on a conventional radar. The technique might even have far-reaching applications as a nonlethal weapon for the military and police as a crowd-control weapon."[252] The interesting thing about this little device is that it operated as a signal modulated (pulsed) on a conventional radar. In other words the radar signal still performed its primary function as a radar while carrying the extra acoustic signal. Any number of carriers could be used in this way to mask, behind a safe technology, a hidden weapon system which would only be detectable to the most sophisticated adversary.

251. Cook, III, Maj. Joseph W. et al. "Nonlethal Weapons: Technologies, Legalities, and Potential Policies." *Air Chronicles.* http://www.airpower.maxwell.af.mil/airchronicles/apj/mcgowan.html EPI1246

252. Nordwall, Bruce. "Radar Warns Birds Of Impending Aircraft." *Aviation Week & Space Technology,* March 10, 1997. EPI1105

victims can more rapidly recover when working with brain-biofeedback practitioners and these new tools.

The research is also teaching us a good deal about our suggestibility in terms of influences which impact our behavior. The underlying message that comes with the new technology is the necessity of providing safeguards against misuse. Additionally, recognition of the everyday stimulation we all get and the effect of these information inputs on our learning processes becomes more clear. Human suggestibility, particularly when in a fatigued condition, has been exploited by terrorists, cults and others in pursuit of their own aims. The passive suggestibility of radio and television as we weave in and out of the semi-sleep states is for the most part not even recognized. The passive learning situations become even more relevant when we consider how we "receive the news" in our daily lives. The ability to influence thinking, behavior and performance is indeed a two-edged sword.

The 1980s and 90s were focused on building up the physical body. The next century will see a focus on building the mind and optimizing mental performance. The idea of merging the new technologies into education is interesting and also calls into question who will decide what is learned. In the interim, the possibilities are incredible for those interested in such pursuits. The control of our mental function is no different than the control of the muscles in our bodies. Learning to control or coordinate the activity of our minds will propel our bodies through a much more productive and fuller life. The new tools may offer just such opportunities.

On the other side of the issue is the potential for misuse and exploitation of the science. Military planners, law enforcement officials and others are now seeking the covert use of these technologies for controlling the ultimate "information processor" – The Human Being.

MK-ULTRA

"Dr. Gottlieb, born August 3, 1918, was the CIA's real-life 'Dr. Strangelove' – a brilliant bio-chemist who designed and headed MK-ULTRA, the agency's most far-reaching drug and mind-control program at the height of the Cold War. Though the super-secret MK-ULTRA was ended in 1964, a streamlined version called MK-SEARCH was continued – with Gottlieb in charge – until 1972."[269] During this period substantial interest in mind control was stimulated by Soviet use of microwaves. In 1988, "thirty-five years after security officers first noticed that the Soviets were bombarding the U.S. embassy in Moscow with microwave radiation, the U.S. government still has not determined conclusively – or is unwilling to reveal – the purpose behind the beams."[270] The government did know what was happening. The Soviets had developed methods for disrupting

269. Foster, Sarah. "Cold War legend dies at 80: Famed as CIA's real-life 'Dr. Strangelove.'" *Worldnetdaily*, March 9, 1999. EPI279

270. Reppert, Barton. "The Zapping of an Embassy: 35 Years Later, The Mystery Lingers." AP, May 22, 1988. EPI1112

purposeful thought of humans and was using their knowledge to impact diplomats in the United States embassy in Moscow.

In 1994 a report concerning the MKULTRA program was released containing the following information:

"In the 1950s and 60s, the CIA engaged in an extensive program of human experimentation, using drugs, psychological, and other means, in search of techniques to control human behavior for counterintelligence and covert action purposes.

In 1973, the CIA purposefully destroyed most of the MKULTRA files concerning its research and testing on human behavior. In 1977, the agency uncovered additional MKULTRA files in the budget and fiscal records that were not indexed under the name MKULTRA. These documents detailed over 150 subprojects that the CIA funded in this area, but no evidence was uncovered at that time concerning the use of radiation.

The CIA did investigate the use and effect of microwaves on human beings in response to a Soviet practice of beaming microwaves on the U.S. embassy. The agency determined that this was outside the scope of the Advisory Committee's purview.

...The Church Committee found some records, but also noted that the practice of MKULTRA at that time was 'to maintain no records of the planning and approval of test programs.'...MKULTRA itself was technically closed out in 1964, but some of its work was transferred to the Office of Research and Development (ORD) within the DS&T under the name MKSEARCH and continued into the 1970s.

The CIA worked closely with the Army in conducting the LSD experiments. This connection with the Army is significant because MKULTRA began at the same time that Secretary of Defense Wilson issued his 1953 directive to the military services on ethical guidelines for human experiments.

Throughout the course of MKULTRA, the CIA sponsored numerous experiments on unwitting humans. After the death of one such individual (Frank Olson, an army scientist, was given LSD in 1953 and committed suicide a week later), an internal CIA investigation warned about the dangers of such experimentation. The CIA persisted in this practice for at least the next ten years. After the 1963 IG report recommended termination of unwitting testing, Deputy Director for Plans Richard Helms (Who later became Director of Central Intelligence) continued to advocate covert testing on the ground that 'positive operational capability to use drugs is diminishing, owing to a lack of realistic testing. With increasing knowledge of state of the art, we are less capable of

negatively). One can envision the development of electromagnetic energy sources, the output of which can be pulsed, shaped, and focused, that can couple with the human body in a fashion that will allow one to prevent voluntary muscular movements, control emotions (and thus actions), produce sleep, transmit suggestions, interfere with both short-term and long-term memory, produce an experience set, and delete an experience set. This will open the door for the development of some novel capabilities that can be used in armed conflict, in terrorist/hostage situations, and in training. New weapons that offer the opportunity of control of an adversary without resorting to a lethal situation or to collateral casualties can be developed around this concept. This would offer significant improvements in the capabilities of our special operation forces. Initial experimentation should be focused on the interaction of electromagnetic energy and the neuromuscular junctions involved in voluntary muscle control. Theories need to be developed, modeled, and tested in experimental preparations. Early testing using in vitro cell cultures of neural networks could provide the focus for more definitive intact animal testing. If successful, one could envision a weapon that would render an opponent incapable of taking any meaningful action involving any higher motor skills, (e.g. using weapons, operating tracking systems). The prospect of a weapon to accomplish this when targeted against an individual target is reasonable; the prospect of a weapon effective against a massed force would seem to be more remote. Use of such a device in an enclosed area against multiple targets (hostage situation) may be more difficult than an individual target system, but probably feasible.

It would also appear to be possible to create high fidelity speech in the human body, raising the possibility of covert suggestion and psychological direction. When a high power microwave pulse in the gigahertz range strikes the human body, a very small temperature perturbation occurs. This is associated with a sudden expansion of the slightly heated tissue. This expansion is fast enough to produce an acoustic wave. If a pulse stream is used, it should be possible to create an internal acoustic field in the 5-15 kilohertz range, which is audible. Thus, it may be possible to 'talk' to selected adversaries in a fashion that would be most disturbing to them.

In comparison to the discussion in the paragraphs above, the concept of imprinting an experience set is highly speculative, but nonetheless, highly exciting. Modern electromagnetic scattering theory raises the prospect that ultrashort pulse scattering through the human brain can result in reflected signals that can be used to construct a reliable estimate of the degree of central nervous system arousal. The

concept behind this 'remote EEG' is to scatter off of action potentials or ensembles of action potentials in major central nervous system tracts. Assuming we will understand how our skills are imprinted and recalled, it might be possible to take this concept one step further and duplicate the experience set in another individual. The prospect of providing a 'been there – done that' knowledge base could provide a revolutionary change in our approach to specialized training. How this can be done or even if it can be done are significant unknowns. The impact of success would boggle the mind!"[273]

The above report was a forecast for the year 2020. However the reality is that these technologies already exist and there are a number of patents in the open literature which clearly show the possibilities. This research is not new but goes back to the 1950s. "A new class of weapons, based on electromagnetic fields, has been added to the muscles of the military organism. The C^3I doctrine is still growing and expanding. It would appear that the military may yet be able to completely control the minds of the civilian population."[274] The targeting of civilian populations by the military is a significant departure from its history. In the past the military has used persuasion through real information rather than using deliberate deception and mind manipulation to win populations over. "A decoy and deception concept presently being considered is to remotely create the perception of noise in the heads of personnel by exposing them to low power, pulsed microwaves. When people are illuminated with properly modulated low power microwaves the sensation is reported as a buzzing, clicking, or hissing which seems to originate (regardless of the person's position in the field) within or just behind the head. The phenomena occurs at average power densities as low as microwatts per square centimeter with carrier frequencies from .4 to 3.0 GHz. By proper choice of pulse characteristics, intelligible speech may be created. Before this technique may be extended and used for military applications, an understanding of the basic principles must be developed. Such an understanding is not only required to optimize the use of the concept for camouflage, decoy and deception operations but is required to properly assess safety factors of such microwave exposure."[275] Actual testing of certain systems has proven that movements, sensations, emotions, desires, ideas, and a variety of psychological phenomena may be induced, inhibited, or modified by electrical stimulation of specific areas of the brain. These facts have changed the classical philosophical concept that the mind was beyond experimental reach."[276]

273. USAF Scientific Advisory Board. *New World Vistas: Air And Space Power For The 21st Century Ancillary Volume.* 1996. EPI402
274. U.S.EPA. *Summary and Results of the April 26-27, 1993 Radiofrequency Radiation Conference, Volume 2: Papers.* 402-R-95-011, March 1995. EPI728
275. Oscar, K.J. *Effects of low power microwaves on the local cerebral blood flow of conscious rats.* Army Mobility Equipment Command. June 1, 1980. EPI1195
276. Delgado, Jose M.R. *Physical Control of the Mind: Toward a Psychocivilized Society.* Harper & Row, Publishers, New York, 1969. EPI850

security tones and combines them with a subliminal message signal to produce an encoded subliminal message signal which is recorded on audio tape or the like. A corresponding subliminal decoder/mixer is connected as part of a user's conventional stereo system and receives as inputs an audio program selected by the user and the encoded subliminal message."282

"Ambient audio signals from the customer shopping area within a store are sensed and fed to a signal processing circuit that produces a control signal which varies with variations in the amplitude of the sensed audio signals. A control circuit adjusts the amplitude of an auditory subliminal anti-shoplifting message to increase with increasing amplitudes of sensed audio signals and decrease with decreasing amplitudes of sensed audio signals. This amplitude controlled subliminal message may be mixed with background music and transmitted to the shopping area."283

"Data to be displayed is combined with a composite video signal. The data is stored in memory in digital form. Each byte of data is read out in sequential fashion to determine: the recurrence display rate of the data according to the frame sync pulses of the video signal; the location of the data within the video image according to the line sync pulses of the video signal; and the location of the data display within the video image according to the position information."284

"This invention is a combination of a subliminal message generator that is 100% user programmable for use with a television receiver. The subliminal message generator periodically displays user specified messages for the normal television signal for specific period of time. This permits an individual to employ a combination of subliminal and supra-liminal therapy while watching television."285

The above may seem a bit complicated, however, they can be summarized. These patents are designed to provide a way to hide messages in video or audio formats masking any suggestions that the programmer wishes to convey. These kinds of messages bypass the conscious mind and are acted upon by the person hearing them – they are not sorted out by the active mind. Although these

282. US Patent #4,777,529, Oct. 11, 1988. Auditory Subliminal Programming System. Inventors: Schultz et al. Assignee: Richard M. Schultz and Associates, Inc. EPI265
283. US Patent # 4,395,600, July 26, 1983. Auditory Subliminal Message System and Method. Inventors: Lundy et al. EPI264
284. US Patent # 5,134,484, July 28, 1992. Superimposing Method and Apparatus Useful for Subliminal Messages. Inventor: Willson, Joseph. Assignee: MindsEye Educational Systems Inc. EPI290.
285. US Patent #5,270,800, Dec. 14, 1993. Subliminal Message Generator. Inventor: Sweet, Robert L. EPI288

technologies are being developed for personal use and as security measures, consider the possibilities for abuse by commercial interests where the messages might be "buy, buy, buy," "drink more, don't worry" or some other self-serving script. Should these systems be regulated? By whom and under what conditions?

New Standards for What is a Memory?

"Nevada is currently the only state to allow witness testimony of a person who has undergone hypnosis. As of October 1, 1997, courts hearing both civil and criminal cases can take a hypnotically refreshed testimony, as long as the witness, if a minor, has had the informed consent of parent or guardian, and the person performing the hypnosis is any of the following: a health care provider, a clinical social worker licensed in accordance with 641B of Nevada Revised statue, or a disinterested investigator."286

This issue will surely become more complex as technology advances in terms of evidence. When the day arrives when it is possible to completely change or alter memory as was suggested earlier by military officers, what then? How will we separate the real from the unreal? What will be the impact on the burden of proof in courts as it relates to "reasonable doubt"? Again the emergence of the technology has to first be recognized as real before laws can be constructed and systems established for controlling misuse. Think how long it has taken the courts to even recognize hypnotherapy as valid science. We are hopeful that we will not have to wait so long for legislative bodies to take the initiative to address these issues.

Auditory Effect?

The questions which this section raises are profound. Is it possible to transmit a signal to the brain of a person, from a distance, which deposits specific sounds, voice or other information which is understandable? Is it possible to transfer sound in a way where only the targeted person can hear the "voice in the head" and no one else hears a thing? Is it possible to shift a person's emotions using remote electromagnetic tools? The answer to each of these questions is a resounding – Yes! The state of the science has passed even the most optimistic predictions and the capabilities are here now.

Military literature suggests that this is possible. A series of experiments, patents and independent research confirm that this technology exists today. While giving testimony to the European Parliament in 1998, I demonstrated one such device to the astonishment of those in attendance. This particular device required physical contact in order to work and was nearly forty years old. This area is one of the most important because it points to the ultimate weapons of

286. Hall, E. Gene. "Watch Carefully Now: Solving Crime in the 21st Century." *Police*, June 1999. Vol. 23, No. 6. Source: NLECTC *Law Enforcement & Technology News Summary*, June 17, 1999. EPI944

apparatus for exciting the nervous system of a person [illegible] electromagnetic waves that are capable of causing that person [illegible] become conscious of information conveyed by the electromagnetic waves."[294] This invention was much different than what others had created by that time because this device actually sent a clear audio signal through the nervous system to the brain. The device could be placed anywhere on the body and a clear voice or music would appear in the head of the subject. This was a most unbelievable device which had actually been invented in the late 1950s. It had taken years to convince patent examiners that it worked. The initial patent was only granted after the dramatic demonstration of the device on a senior employee of the US Patent Office. In 1972 a second patent was issued to G. Patrick Flanagan after being suppressed by the military since 1968. This device was much more efficient in that it converted speech waveform into "a constant amplitude square wave in which the transitions between the amplitude extremes are spaced so as to carry the speech information."[295] What this did is establish the code or modulation or timing sequences necessary for efficient transfers into the nervous system where the signals could be sent to the brain and decoded as sound in the same way that normal sound is decoded. The result was a clear and understandable sound.

The military interest was present since the first inventions were patented, but in 1971 a system was designed which would allow troops to communicate through a radio transmitter which would render the enemy deaf and disoriented while allowing "friendly" combatants to communicate at the same time. The device was described as follows: "Broadly, this disclosure is directed to a system for producing aural and psychological disturbances and partial deafness of the enemy during combat situation. Essentially, a high directional beam is radiated from a plurality of distinct transducers and is modulated by a noise, code, or speech beat signal. The invention may utilize various forms and may include movable radiators mounted on a vehicle and oriented to converge at a desired point, independently positioned vehicles with a common frequency modulator, or means employed to modulate the acoustical beam with respect to a fixed frequency. During combat, friendly forces would be equipped with a reference generator to provide aural demodulation of the projected signal, thereby yielding an intelligible beat signal while enemy personnel would be rendered partially deaf by the projected signal as well as being unable to perceive any intelligence transmitted in the form of a modulated beat signal."[296] What this says simply is that at-a-distance personal communication could be achieved by one's own forces while denying it to another and disabling adversaries at the same time.

294. US Patent #3,393,279, July 16, 1968. Nervous System Excitation Device. Inventor: Flanagan, Gillis Patrick. Assignee: Listening Incorporated. EPI261
295. US Patent #3,647,970, March 7, 1972. Method and System of Simplifying Speech Waveforms. Inventor: Flanagan, Gillis P. EPI259
296. US Patent #3,566,347, Feb. 23, 1971. Psycho-Acoustic Projector. Inventor: Flanders, Andrew E. Assignee: General Dynamics Corporation. EPI260

In 1974, using a microwave, it was noted that the signal was [illegible]ed (transduced) by the receiver into an acoustic signal. This was [illegible]gnal that was "heard" inside or just behind the head. The report [illegible]: "...it was noticed that the apparent locus of the 'sound' moved [illegible]the observer's head to the absorber. That is, the absorber acted [illegible]transducer from microwave energy to an acoustic signal. This [illegible]vation, to the best of our knowledge, has not been described in [illegible]terature and may serve as a mechanism mediating the 'hearing' [illegible]lsed microwave signals."[297]

By 1989 the science took another leap forward with the [illegible]bination of the modulated signal on a microwave carrier. This [illegible]ded a much more efficient delivery of the sound. It was reported [illegible]"Sound is induced in the head of a person by radiating the head [illegible] microwaves in the range of 100 megahertz to 10,000 megahertz [illegible]are modulated with a particular waveform. The waveform consists [illegible]requency modulated bursts. Each burst is made up of ten to [illegible]nty uniformly spaced pulses grouped tightly together. The burst [illegible]th is between 500 nanoseconds and 100 microseconds. The pulse [illegible]th is in the range of 10 nanoseconds to 1 microsecond. The bursts [illegible] frequency modulated by the audio input to create the sensation of [illegible]ring in the person whose head is irradiated."[298] Two patents were [illegible]d that year which addressed this breakthrough. The first [illegible]vention relates to devices for aiding of hearing in mammals. The [illegible]ention is based upon perception of sounds which is experienced in [illegible] brain when the brain is subjected to certain microwave radiation [illegible]nals."[299] And the second confirmed the earlier observations by [illegible]ting that "Sound is induced in the head of a person by radiating [illegible] head with microwaves in the range of 100 megahertz to 10,000 [illegible]egahertz that are modulated with a particular waveform. The [illegible]veform consists of frequency modulated bursts. Each burst is made [illegible] of ten to twenty uniformly spaced pulses grouped tightly [illegible]gether."[300]

In 1992 another patent described: "A silent communications [illegible]ystem in which nonaural carriers, in the very low or very high audio [illegible]equency range or in the adjacent ultrasonic frequency spectrum, are [illegible]mplitude or frequency modulated with the desired intelligence and [illegible]propagated acoustically or vibrationally, for inducement into the [illegible]rain, typically through the use of loudspeakers, earphones or [illegible]iezoelectric transducers."[301] This device had limited practicality in [illegible]hat it required that the person be in contact or close proximity to the [illegible]ending device. When examined together, each of these patents are [illegible]een to be discrete steps toward a new weapon system.

297. Sharp et al. "Generation of Acoustic Signals by Pulsed Microwave Energy." *IEEE Transactions On Microwave Theory And Techniques*, May 1974. EPI817
298. US Patent #4,877,027, Oct. 31, 1989. Hearing System. Inventor: Brunkan, Wayne. EPI1124
299. US Patent #4,858,612, Aug. 22, 1989. Hearing Device. Inventor: Stocklin, William L. EPI270
300. US Patent #4,877,027, Oct. 31, 1989. Hearing System. Inventor: Brunkan, Wayne B. EPI262
301. US Patent #5,159,703, Oct. 27, 1992. Silent Subliminal Presentation System. Inventor: Lowry, Oliver M. EPI285

areas."309 This technology could be used for determining what a person might do, given his totally discernible interior emotions. This technology walks through any behavior wall a person can erect and goes straight to the brain to see what might be on a person's mind.

Inducing behavior rather than just reading a person's emotional state is the subject of one scientist's work in Canada. "Scientists are trying to recreate alien abductions in the laboratory... The experiment, to be run by Professor Michael Persinger, a neuroscientist at Laurentian University, of Sudbury, Ontario, consists of a converted motorcycle helmet with solenoids on its sides that set up magnetic fields across a subject's head."310 This experiment was carried out and was the subject of a Canadian Broadcasting System exposé on mind control. The segment ran on a program called "Undercurrents" in February 1999. One of the authors of this book also appeared in that program along with several others interested in this field.

Dr. Persinger for over 20 years "has been working on a theory that connects not only UFO's and earthquakes, but also powerful electromagnetic fields and an explanation of paranormal beliefs in terms of unusual brain activity. He has also found that stimulating another area, the temporal lobes, can produce all sorts of mystical experiences, out-of-body sensations and other apparently paranormal phenomena."311 The work of this doctor suggests that these experiences may be the results of activity in the brain and not the actual experiences of the individuals. He has had some measure of success in recreating many of these experiences in his subjects. Dr. Persinger is also known for his work in studying the effects of ELF on memory and brain function.312

In 1991 a method for changing brain waves to a desired frequency was patented.313 A 1975 patent discussed a similar technology, a device and method for "sensing brain waves at a position remote from a subject whereby electromagnetic signals of different frequencies are simultaneously transmitted to the brain of the subject in which the signals interfere with one another to yield a waveform which is modulated by the subject's brain waves. The interference waveform which is representative of the brain wave activity is retransmitted by the brain to a receiver where it is demodulated and amplified. The demodulated waveform is then displayed for visual viewing and then routed to a computer for further processing and analysis. The demodulated waveform also can be used to produce a compensating signal which is transmitted back to the

309. US Patent #5,507,291, April 16, 1996. Method And An Associated Apparatus For Remotely Determining Information As To Person's Emotional State. Inventors: Stirbl et al. EPI1130
310. Watts, Susan. "Alien kidnaps may just be mind zaps." *Sydney Morning Herald*, Nov. 19, 1994. EPI816
311. Opall, Barbara. "U.S. Explores Russian Mind-Control Technology." *Defense News*, Jan. 11-17, 1993. EPI818
312. Persinger, M. et al. "Partial Amnesia For a Narrative Following Application of Theta Frequency EM Fields." *Journal of Bioelectricity*, Vol. 4(2), pp. 481-494 (1985). EPI372
313. US Patent #5,036,858, Aug. 6, 1991. Method And Apparatus For Changing Brain Wave Frequency. Inventors: Carter et al. EPI1127

brain to effect a desired change in electrical activity therein."314 In simple terms, the brain's activity is mapped in order to read a person's emotional state, conceptual abilities or intellectual patterns. A second signal can be generated and sent back into the brain which overrides the natural signal, causing the brain's energy patterns to shift. This is called "brain entrainment" which causes the shift in consciousness. There are many uses, of a positive nature, for this kind of technology, as was mentioned at the front of this section, the important factor being who controls the technology and for what purpose. In the leading scientific journal, *Nature*, the following encapsulating statement appeared:

> "But neuroscience also poses potential risks, he said, arguing that advances in cerebral imaging make the scope for invasion of privacy immense...it will become commonplace and capable of being used at a distance, he predicted. That will open the way for abuses such as invasion of personal liberty, control of behavior and brainwashing."315

Dancing to the Tune of an Unknown Drummer

In "a dramatic demonstration of mind reading, neuroscientists have created videos of what a cat sees by using electrodes implanted in the animal's brain. 'Trying to understand how the brain codes information leads to the possibility of replacing parts of the nervous system with an artificial device,' he said."316 The scientist commenting on this technology saw the future possibility of brain activity mapping being used in creating electronic components to replace damaged parts of the system. The use of mind mapping had other possibilities as well. Similar research was pursued by Dr. José Delgado at one of the country's leading research institutions in controlling the behavior of humans and animals. Actual testing of certain systems proved "that movements, sensations, emotions, desires, ideas, and a variety of psychological phenomena may be induced, inhibited, or modified by electrical stimulation of specific areas of the brain."317 By 1985, Dr. Delgado was able to create these effects using only a radio signal sent to the brain remotely, using energy concentrations of less than 1/50th of what the Earth naturally produces. This discovery implied that frequency, waveform and pulse rate (modulation) were the important factors rather than the amount of energy being used. In considering this it makes sense because the human body does not require high electromagnetic power concentration to regulate its normal functioning – the key was in finding the "tuning" mechanisms for locating the right "receiving station" in the brain.

314. US Patent #3,951,134, April 20. 1976. Apparatus And Method For Remotely Monitoring And Recording Brainwaves. Inventor: Malech, Robert G. Assignee: Dome & Margolin Inc. EPI1122
315. *Nature*. "Advances In Neuroscience 'May Threaten human rights.'" Vol 391. Jan. 22, 1998. EPI116
316. Kahney, Leander. "A Cat's Eye Marvel." *Wired News*, Oct. 7, 1999. http://www.wired.com/news/technology/story/22116.html EPI832
317. Delgado, Jose M.R. *Physical Control of the Mind: Toward a Psychocivilized Society*. Harper & Row, Publishers. New York, 1969. EPI850