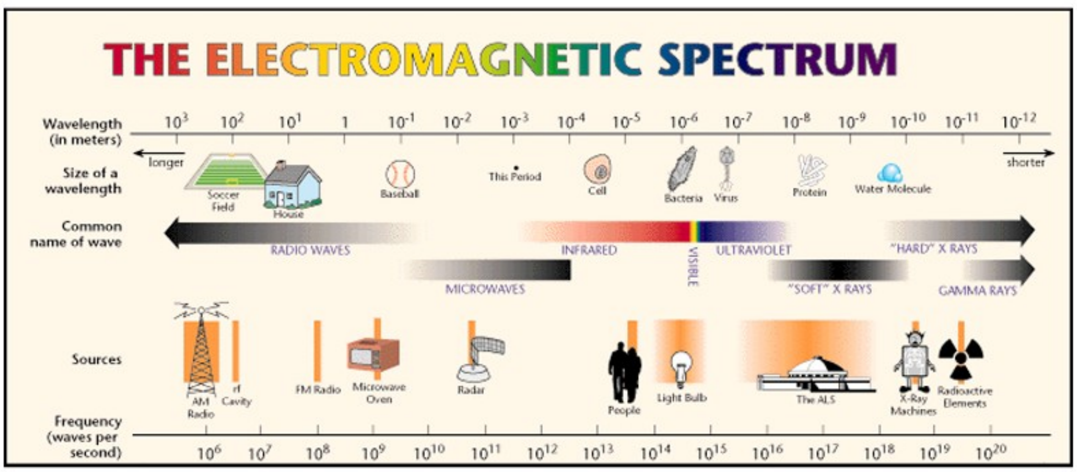
Chapter 7 - Radar and Neuroweapons

My first experience with radar was as a radar operator in the US Navy. Watching the sweeping green line making its centrifugal rounds of any contacts on the green tinted screen. Radar is a detection system that uses radio waves to determine the range, angle, or velocity of objects. It can be used to detect aircraft, ships, spacecraft, guided missiles, motor vehicles, weather formations, and terrain. A radar system consists of a transmitter producing electromagnetic waves in the radio or microwaves domain, a transmitting antenna, a receiving antenna (often the same antenna is used for transmitting and receiving) and a receiver and processor to determine properties of the object(s). Radio waves (pulsed or continuous) from the transmitter reflect off the object and return to the receiver, giving information about the object's location and speed. Radar is a direct outcome of the British need to detect incoming Nazi German aircraft, and again we see the relationship of technical advance to warfare.



Courtesy Berkeley National Laboratory

Radar Frequencies

IEEE Standard Radar Bands
(Typical Use)

HF	3 – 30 MHz
VHF	30 MHz–300 MHz
UHF	300 MHz–1 GHz
L-Band	1 GHz–2 GHz
S-Band	2 GHz–4 GHz
C-Band	4 GHz–8 GHz
X-Band	8 GHz–12 GHz
Ku-Band	12 GHz–18 GHz
K-Band	18 GHz–27 GHz
Ka-Band	27 GHz–40 GHz
W-Band	40 GHz – 100+ GHz

Search Radars

Search & Track Radars

Fire Control & Imaging Radars

Missile Seekers

Introduction-25

MIT Lincoln Laboratory

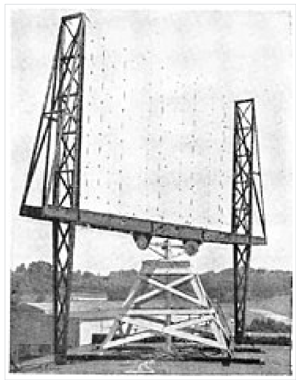
History of Radar Wiki Overview:

As early as 1886, German physicist Heinrich Hertz showed that radio waves could be reflected from solid objects. In 1895, Alexander Popov, a physics instructor at the Imperial Russian Navy school in Kronstadt, developed an apparatus using a coherer tube for detecting distant lightning strikes. The next year, he added a spark-gap transmitter. In 1897, while testing this equipment for communicating between two ships in the Baltic Sea, he took note of an interference beat caused by the passage of a third vessel. In his report, Popov wrote that this phenomenon might be used for detecting objects, but he did nothing more with this observation.

The German inventor Christian Hülsmeyer was the first to use radio waves to detect "the presence of distant metallic objects". In 1904, he demonstrated the feasibility of detecting a ship in dense fog, but not its distance from the transmitter. He obtained a patent for his detection device in April 1904 and later a patent for a related amendment for estimating the distance to the ship. He also obtained a British patent on September 23, 1904 for a full radar system, that he called a *telemobiloscope*. It operated on a 50 cm wavelength and the pulsed radar signal was created via a spark-gap. His system already used the classic antenna setup of horn antenna with parabolic reflector and was presented to German military officials in practical tests in Cologne and Rotterdam harbour but was rejected.

In 1915, Robert Watson-Watt used radio technology to provide advance warning to airmen and during the 1920s went on to lead the U.K. research establishment to make many advances using radio techniques, including the probing of the ionosphere and the detection of lightning at long distances. Through his lightning experiments, Watson-Watt became an expert on the use of radio direction finding before turning his inquiry to shortwave transmission. Requiring a suitable receiver for such studies, he told the "new boy" Arnold Frederic Wilkins to conduct an extensive review of available shortwave units. Wilkins would select a General Post Office model after noting its manual's description of a "fading" effect (the common term for interference at the time) when aircraft flew overhead.

Across the Atlantic in 1922, after placing a transmitter and receiver on opposite sides of the Potomac River, U.S. Navy researchers A. Hoyt Taylor and Leo C. Young discovered that ships passing through the beam path caused the received signal to fade in and out. Taylor submitted a report, suggesting that this phenomenon might be used to detect the presence of ships in low visibility, but the Navy did not immediately continue the work. Eight years later, Lawrence A. Hyland at the Naval Research Laboratory (NRL) observed similar fading effects from passing aircraft; this revelation led to a patent application as well as a proposal for further intensive research on radio-echo signals from moving targets to take place at NRL, where Taylor and Young were based at the time.Just before World War II



Experimental radar antenna, US Naval Research Laboratory, Anacostia, D. C., late 1930s

Before the Second World War, researchers in the United Kingdom, France, Germany, Italy, Japan, the Netherlands, the Soviet Union, and the United States, independently and in great secrecy, developed technologies that led to the modern version of radar. Australia, Canada, New Zealand, and South Africa followed prewar Great Britain's radar development, and Hungary generated its radar technology during the war.

In France in 1934, following systematic studies on the split-anode magnetron, the research branch of the Compagnie Générale de Télégraphie Sans Fil (CSF) headed by Maurice Ponte with Henri Gutton, Sylvain Berline and M. Hugon, began developing an obstacle-locating radio apparatus, aspects of which were installed on the ocean liner *Normandie* in 1935.

During the same period, Soviet military engineer P.K. Oshchepkov, in collaboration with Leningrad Electrophysical Institute, produced an experimental apparatus, RAPID, capable of detecting an aircraft within 3 km of a receiver. The Soviets produced their first mass production radars RUS-1 and RUS-2 Redut in 1939 but further development was slowed following the arrest of Oshchepkov and his subsequent gulag sentence. In total, only 607 Redut stations were produced during the war. The first Russian airborne radar, Gneiss-2, entered into service in June 1943 on Pe-2 dive bombers. More than 230 Gneiss-2 stations were produced by the end of 1944. The French and Soviet systems, however, featured continuous-wave operation that did not provide the full performance ultimately synonymous with modern radar systems.

Full radar evolved as a pulsed system, and the first such elementary apparatus was demonstrated in December 1934 by the American Robert M. Page, working at the Naval Research Laboratory. The following year, the United States Army successfully tested a primitive surface-to-surface radar to aim coastal battery searchlights at night. This design was followed by a pulsed system demonstrated in May 1935 by Rudolf Kühnhold and the firm GEMA [de] in Germany and then another in June 1935 by an Air Ministry team led by Robert Watson-Watt in Great Britain.

The first workable unit built by Robert Watson-Watt and his team

In 1935, Watson-Watt was asked to judge recent reports of a German radio-based death ray and turned the request over to Wilkins. Wilkins returned a set of calculations demonstrating the system was basically impossible. When Watson-Watt then asked what such a system might do, Wilkins recalled the earlier report about aircraft causing radio interference. This revelation led to the Daventry Experiment of 26 February 1935, using a powerful BBC shortwave transmitter as the source and their GPO receiver setup in a field while a bomber flew around the site. When the plane was clearly detected, Hugh Dowding, the Air Member for Supply and Research was very impressed with their system's potential and funds were immediately provided for further operational development. Watson-Watt's team patented the device in GB593017.

Development of radar greatly expanded on 1 September 1936 when Watson-Watt became Superintendent of a new establishment under the British Air Ministry, Bawdsey Research Station located in Bawdsey Manor, near Felixstowe, Suffolk. Work there resulted in the design and installation of aircraft detection and tracking stations called "Chain Home" along the East and South coasts of England in time for the outbreak of World War II in 1939. This system provided the vital advance information that helped the Royal Air Force win the Battle of Britain; without it, significant numbers of fighter aircraft, which Great Britain did not have available, would always need to be in the air to respond quickly. If enemy aircraft detection relied solely on the observations of ground-based individuals, Great Britain may have lost the Battle of Britain. Also vital was the "Dowding system" of reporting and coordination to provide the best use of radar information during the tests of early radar deployment during 1936 and 1937.

Given all required funding and development support, the team produced working radar systems in 1935 and began deployment. By 1936, the first five Chain Home (CH) systems were operational and by 1940 stretched across the entire UK including Northern Ireland. Even by standards of the era, CH was crude; instead of broadcasting and receiving from an aimed antenna, CH broadcast a signal floodlighting the entire area in front of it, and then used one of Watson-Watt's own radio direction finders to determine the direction of the returned echoes. This fact meant CH transmitters had to be much more powerful and have better antennas than competing systems but allowed its rapid introduction using existing technologies.

A key development was the cavity magnetron in the UK, which allowed the creation of relatively small systems with sub-meter resolution. Britain shared the technology with the U.S. during the 1940 Tizard Mission.

In April 1940, *Popular Science* showed an example of a radar unit using the Watson-Watt patent in an article on air defence.[Also, in late 1941 *Popular Mechanics* had an article in which a U.S. scientist speculated about the British early warning system on the English east coast and came close to what it was and how it worked. Watson-Watt was sent to the U.S. in 1941 to advise on air defense after Japan's attack on Pearl Harbor. Alfred Lee Loomis organized the secret MIT Radiation Laboratory at Massachusetts Institute of Technology, Cambridge, Massachusetts which developed microwave radar technology in the years 1941–45. Later, in 1943, Page greatly improved radar with the monopulse technique that was used for many years in most radar applications.

(See ‘Radar’, Wikipedia, https://en.wikipedia.org/wiki/Radar)

Illumination

Radar relies on its own transmissions rather than light from the Sun or the Moon, or from electromagnetic waves emitted by the target objects themselves, such as infrared radiation (heat). This process of directing artificial radio waves towards objects is called *illumination*, although radio waves are invisible to the human eye as well as optical cameras.

The klystron was the first significantly powerful source of radio waves in the microwave range; before its invention the only sources were the Barkhausen-Kurz tube and split anode magnetron, which were limited to very low power. It was invented by the brothers Russell and Sigurd Varian at Stanford University. Their prototype was completed and demonstrated successfully on August 30, 1937. Upon publication in 1939, news of the klystron immediately influenced the work of US and UK researchers working on radar equipment. The Varians went on to found Varian Associates to commercialize the technology (for example, to make small linear accelerators to generate photons for external beam radiation therapy). Their work was preceded by the description of velocity modulation by A. Arsenjewa-Heil and Oskar Heil (wife and husband) in 1935, though the Varians were probably unaware of the Heils' work.[6]

The work of physicist W.W. Hansen was instrumental in the development of the klystron and was cited by the Varian brothers in their 1939 paper. His resonator analysis, which dealt with the problem of accelerating electrons toward a target, could be used just as well to decelerate electrons (i.e., transfer their kinetic energy to RF energy in a resonator). During the second World War, Hansen lectured at the MIT Radiation labs two days a week, commuting to Boston from Sperry Gyroscope Company on Long Island. His resonator was called a "rhumbatron" by the Varian brothers. Hansen died of beryllium disease in 1949 as a result of exposure to beryllium oxide (BeO).

During the Second World War, the Axis powers relied mostly on (then low-powered and long wavelength) klystron technology for their radar system microwave generation, while the Allies used the far more powerful but frequency-drifting technology of the cavity magnetron for much shorter-wavelength one centimeter microwave generation. Klystron tube technologies for very high-power applications, such as synchrotrons and radar systems, have since been developed.

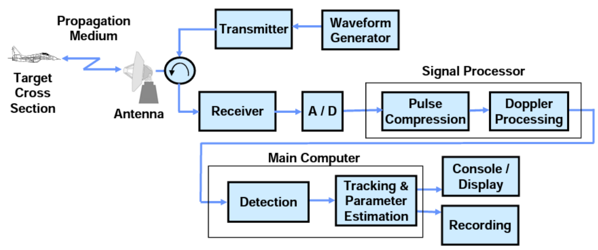
Right after the war, AT&T used 4 watt klystrons in its brand new network of microwave relay links that covered the US continent. The network provided long-distance telephone service and also carried television signals for the major TV networks. Western Union Telegraph Company also built point-to-point microwave communication links using intermediate repeater stations at about 40 mile intervals at that time, using 2K25 reflex klystrons in both the transmitters and receivers

(Wikipedia, ‘Klystron’, https://en.wikipedia.org/wiki/Klystron)

As a software engineer, including work in cyber security, I followed the Snowden leaks regarding NSA Computer Network Operations with interest. The hacking tools employed by the NSA as revealed by Snowden, had some intriguing elements. If you go through the leaks you will read how they could install ports and chips into targeted systems, and power them through Radar, by directing a radar signal at the target the device inserted into their system would be energized, a basic magnetron. Similarly, you will read reports from former MI-5 and MI-6 agents that talk of doing this same thing to their targets, deploying radar for the purposes of covert surveillance. Radar's relationship to neuroweapons is not just limited to CN ops. The Frey effect itself, hearing voices not spoken inside one's head, was a direct outcome of radar technicians experiences while maintaining the radar, they would start to hear strange things inside their heads, leading to the discovery of the Frey effect. In another ironic twist with contemporary politics, one of the leading engineers on the US Radar systems during World War II at MIT in Boston, was David G. Trump, the uncle of President Trump. Who was dispatched upon Tesla's death, Tesla suggested a radar system in 1917 to American investors, to investigate Tesla's papers and remarked that there was nothing to see in them upon reviewing them.

Radar Functional Theory

In the following section is a brief review of the equations and theories of Radar operation. The following is based on O'Donnell (2021) lectures at MIT Lincoln Laboratory. A very basic block diagram of a radar system is this:



The Radar Range Equation Connects:

1. Target Properties - e.g. Target Reflectivity (radar cross section)
2. Radar Characteristics - e.g. Transmitter Power, Antenna Aperture
3. Distance between Target and Radar - e.g. Range
4. Properties of the Medium - e.g. Atmospheric Attenuation.

(O'Donnell 2021)

Radar sends out a EM wave in the microwave bandwidths hitting a reflection or object then a very small amount of energy bounces off the target and is processed by the Radar's receivers. Then the signal undergoes processing and finally output to a User Interface of some kind. The two main components of radar in terms of scientific equations is the Received Signal equation and the Radar Range Equation including signal to noise equations. First, the Received Signal equation is formulated as:

$$\text{Received Signal Energy} = \overset{\text{Transmit Power}}{\left[P_T \right]} \overset{\text{Transmit Gain}}{\left[\frac{4\pi A}{\lambda^2} \right]} \overset{\text{Spread Factor}}{\left[\frac{1}{4\pi R^2} \right]} \overset{\text{Losses}}{\left[\frac{1}{L} \right]} \overset{\text{Target RCS}}{\left[\sigma \right]} \overset{\text{Spread Factor}}{\left[\frac{1}{4\pi R^2} \right]} \overset{\text{Receive Aperture}}{\left[A \right]} \overset{\text{Dwell Time}}{\left[\tau \right]}$$

(O'Donnell 2021)

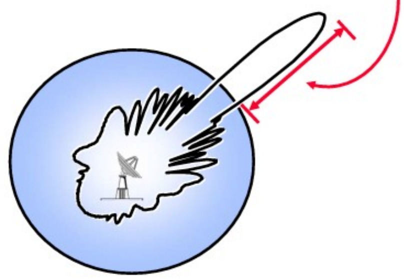
This equation is used to measure the echo from an object or target that the radar signal has a hit on. The objects echo foot print is represented by Target RCS (sigmoid), this is the area of the object that the radar can see and receives a return signal or echo from, it is a small fraction of the original sent signal amplitude. The radar equation is used to formulate the details of the echo and processing of it, in this book I use the equations for tracking a target also known as surveillance radar, we atart with the Radar Range equation:

Power density from isotropic antenna $\dfrac{P_t}{4 \pi R^2}$

P_t = peak transmitter power
R = distance from radar

Power density from directive antenna $\dfrac{P_t G_t}{4 \pi R^2}$

G_t = transmit gain



Gain is the radiation intensity of the antenna in a given direction over that of an isotropic (uniformly radiating) source

Gain = $4 \pi A / \lambda^2$

(O'Donnell 2021)

For our purposes we are using the 'Power desnity form a directive antenna'. Next we get the Radar Cross Section (RCS or sigmoid). RCS is a measure of the energy that a radar target intercepts and scatters back toward the radar:

Power of reflected signal at target $\dfrac{P_t G_t \sigma}{4 \pi R^2}$

σ = radar cross section units (meters)^2

Power density of reflected signal at the radar $\dfrac{P_t G_t}{4 \pi R^2} \dfrac{\sigma}{4 \pi R^2}$

Power density of reflected signal falls off as ($1/R^2$)

The received power is the power density at the radar times the area of the receiving antenna.

Power of reflected signal from target and received by radar $P_r = \dfrac{P_t G_t}{4 \pi R^2} \dfrac{\sigma A_e}{4 \pi R^2}$

P_r = power received
A_e = effective area of receiving antenna

Finally, we have to finish the radar equation with the Signal-to-Noise (SNR) ratio which is calculated from the following:

Signal Power reflected from target and received by radar $$P_r = \frac{P_t G_t}{4 \pi R^2} \frac{\sigma A_e}{4 \pi R^2}$$

Average Noise Power $$N = k T_s B_n$$

Signal to Noise Ratio $$S / N = P_r / N$$

$$\boxed{S / N = \frac{P_t G^2 \lambda^2 \sigma}{(4 \pi)^3 R^4 k T_s B_n L}}$$

Assumptions :
$G_t = G_r$
L = Total System Losses
$T_o = 290^o$ K

(O'Donnell 2021)

Radar in Intelligence and Surveillance

In an earlier chapter we discussed how the use of agents to track an intelligence target in Northern Ireland, specifically, Irish Catholic nationalists, was something like 50 agents per 1 target. This labour intensive process of surveillance of an intelligence target was the main reason to use cyber as a means of tracking targets, it reduced the need for so many agents, before the creation of more advanced techniques for tracking in the early 2000s a part of the manual surveillance was the use of Radar to track a target by secret intelligence throughout the world, a hidden trade craft that is not discussed publicly except in rare circumstances by British ex-intelligence specialists such as Dr. Barry Trower and ex-agent Carl Clark.

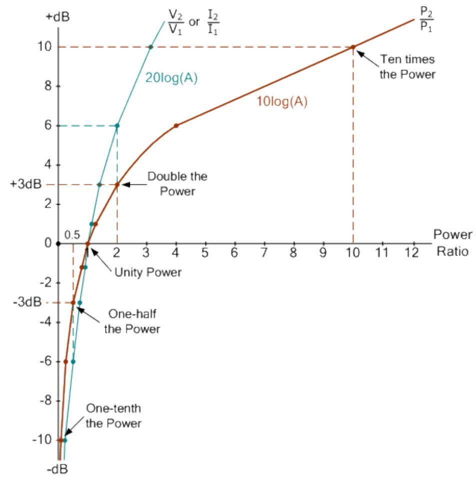
Clark describes how he would deploy Radar against a target:

> Carl Clark: It's a bit like what takes place in a science fiction movie. People can be tracked anywhere by radar, satellite, a base station and complimentary computer programs. For example, three radar devices would sometimes be positioned in the vicinity of the target. The radar emits electromagnetic waves, some of which pick up the target and the result is then evaluated. My friends who work in the special department could then follow the target all day on their computers. This form of localising the target made it easy to deploy the weapons accurately. My colleagues could see exactly where to aim and also observe how the target reacted. (Groß 2009)

This was similar to descriptions Dr. John Norseen described as using radar for the purposes of Thought Injection and Biofusion.

...a couple emails back you talked about how you can feel different thought patterns, sometimes just a twinge, other times full bore…well, I wrote a rather lengthy project report for NASA back in 2000 and also for NSA related to Cryptomnesia…this is Greek for the Continuum of signals and noises that can occur in a brain.

Imagine a Vertical Bar to the left of this page. In the middle of the bar would be zero dB or decibel, and it would move to over 100 db + positive to the top...and in the same vein would register down into 150-200 db – negative.



A generic example showing the relationship of dBs to Power

This is exactly the same kind of measurement scale that is used to rate a submarine sound signal or Electromagnetic Signal...positive and negative. Well, it is possible using EEG and other BioFusion tools that one can track the movement of Identified Thoughts or Semiotic Structures as they emanate Functions or Communications (INTENT). In fact, right now, you Duncan, probably have hundreds or thousands of Thoughts and mini-thoughts that are dancing around, and banging around inside your head, just like a radar sweep looking out at weather patterns…one can radar sweep the semiotic conditions inside of your head and plot them on this Cryptomnesia Scale. You can even apply Doppler analysis and see which thoughts are growing in intensity, or dying out, or getting stuck in “feed-back” loops, sustaining themselves, perhaps in Unconscious or Non-Cognitive zones, at let's say – 100 db or -35-50 db, self obsessive routines, etc. etc.

FIGURE 30: BASYS, BIOLOGICAL ARCHITECTURES & SCIENTIFIC SYSTEMS

When thoughts emerge past zero and move into the high positive values then you can clearly see that that is what is occupying the Mental Awake State of the person...you can flash brief visuals or sound types or kinesthetic potentials, and you can see the Brain Thought adjust…

(Norseen, 2002, part 6)

This is similar to the NSA using Radar to illuminate a target computer for off-line retrieval of information in a covert manner. This was first brought to public attention through the Snowden Leaks, where old NSA files were leaked by a contractor to show systematic abuse of personal privacies, again it is an important leak, but also all the leaked materials were out-of-date and not the latest technology even at the time of the leaks. One such system that is used was the CTX4000 system which has been replaced by what they termed ‘PHOTOANGLO’ again showing the Anglo-Saxon bias of UKUSA secret intelligence, rather then calling it PHOTOBRIT for example, inclusive of all British nations including the Irish of Northern Ireland. It works in tandem with other components such as VAGRANT and NIGHTWATCH- portable computer to display data from VAGRANT retrieved via PHOTOANGLO. NSA docs relate the following:

TOP SECRET//COMINT//REL TO USA, FVEY

PHOTOANGLO

ANT Product Data

(TS//SI//REL TO USA,FVEY) PHOTOANGLO is a joint NSA/GCHQ project to develop a new radar system to take the place of the CTX4000.

24 Jul 2008

(U) Capabilities

(TS//SI//REL TO USA,FVEY) The planned capabilities for this system are:

- Frequency range: 1 - 2 GHz, which will be later extended to 1 - 4 GHz.
- Maximum bandwidth: 450 MHz.
- Size: Small enough to fit into a slim briefcase.
- Weight: Less than 10 lbs.
- Maximum Output Power: 2 W
- Output:
- Video
- Transmit antenna
- Inputs:
- External oscillator
- Receive antenna

(U) Concept of Operation

(TS//SI//REL TO USA,FVEY) TS//SI//REL TO USA,FVEY) The radar unit generates an un-modulated, continuous wave (CW) signal. The oscillator is either generated internally, or externally through a signal generator or cavity oscillator. The unit amplifies the signal and sends it out to an RF connector, where it is directed to some form of transmission antenna (horn, parabolic dish, LPA, spiral). The signal illuminates the target system and is re-radiated. The receive antenna picks up the re-radiated signal and directs the signal to the receive input. The signal is amplified, filtered, and mixed with the transmit antenna. The result is a homodyne receiver in which the RF signal is mixed directly to baseband. The baseband video signal is ported to an external BNC connector. This connects to a processing system, such as NIGHTWATCH, an LFS-2, or VIEWPLATE, to process the signal and provide the intelligence.

Unit Cost: $40k (planned)

Status: Development. Planned IOC is 1st QTR FY09.

POC: [redacted], S32243, [redacted], [redacted]@nsa.ic.gov

Derived From: NSA/CSSM 1-52
Dated: 20070108
Declassify On: 20320108

TOP SECRET//COMINT//REL TO USA, FVEY

One can see the similarity to Thought Injection/BioFusion that targets wetware and the hardware version of PHOTOANGLO. Both are for remote monitoring using Radar.

Bearden on Time Reversed Waves, No it's not Time-Travel

Lt. Col. Tom Bearden (USA, ret.) brought to attention the use of time-reversed waves in the sense of reversing back from a given pathway, not in reverse time, of a beam of energy and Radar in the mid-1980s. He explicates on the subject and it's connection to radar:

> At the end of WWII, the Soviet Union obtained the cream of the crop of Germany's radar scientists and infrared scientists.
>
> At that time, the German scientific team led the world in the theory and technology of radar absorbing materials (RAM) and radar cross section. For example, some leading Western radar experts believe that the German scientists had already advanced the theory of radar cross section beyond where Western scientists have arrived at today. Radar cross section science is the "heart" of modern radar technology, countermeasures, and counter-countermeasures.
>
> The theory of RAM technology is precisely what is needed to develop and design phase conjugate mirrors for radar frequency bands. Phase conjugate mirrors are capable of producing a time-reversed (TR) wave in direct response to a received ordinary wave. The mirror may be powerfully "pumped" with energy to produce a very large amplification of the time-reversed wave.

He continues:

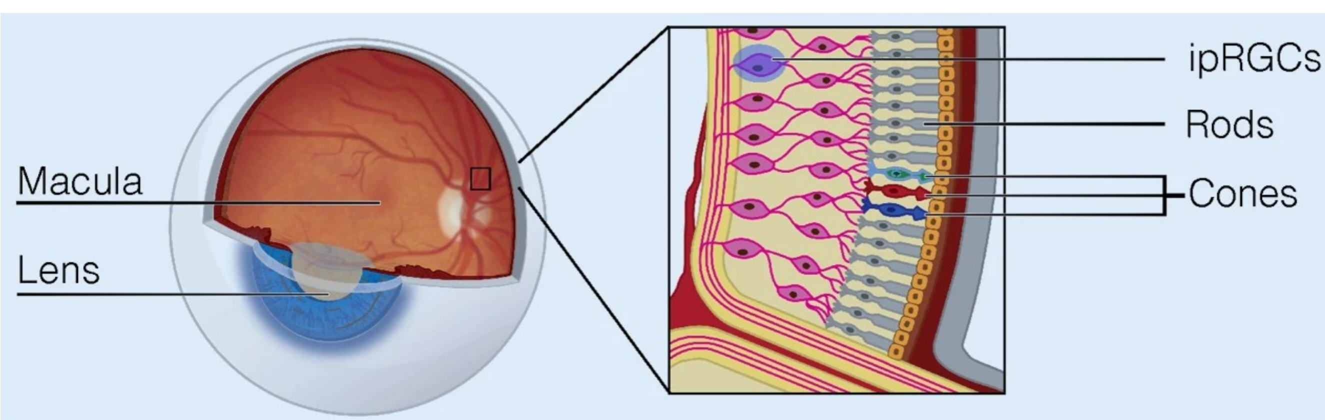
> Compared to a normal wave, a time-reversed wave has startlingly different weapon capabilities.
>
> Such a wave precisely retraces the path of the ordinary wave that stimulated it to be formed. So it possesses an "invisible wire" through space, back to the original position of whatever emitted its stimulus wave.
>
> Further, the time-reversed wave continually converges upon its invisible "back- tracking" path. It does not diverge and spread its energy, in contradistinction to normal waves.
>
> Using several simple schemes (particularly pumped 4-wave mixing), extremely large amplification of the time-reversed (TR) wave can be cheaply and readily accomplished.
>
> A startling weapons capability therefore emerges when amplified TR waves are generated in response to received signals from a distant target:
>
> (1) If any signal at all can be received from a distant target, a return TR signal of extreme power can be delivered directly to that target Almost all of the transmitted TR signal energy will arrive at and in the distant target, even through a highly nonlinear medium or under scattering conditions. Hardly any of the energy will be lost enroute. If the target is fast-moving, a "lead correction" signal can be calculated and added to steer the return path.
>
> (2) Since real-time holography can readily be accomplished using TR waves - and without first making holograms, geometrical forms (balls, shapes, hemispherical shells, etc) of energy can be created readily by interferometry (crossed beam techniques). Since the TR wave

> carriers do not disperse with distance, these interference energy forms can be assembled by crossed TR wave beams at great distances-even hundreds of thousands of miles. The energy appearing in such a distantly created energy form is limited only by the amount one cares to put in at the amplified transmitting end.
>
> Thus the radar itself now becomes a powerful, all-around weapon. With a TR wave adjunct, once the radar receives a return signal from a target, an extremely powerful TR wave pulse can be generated, and all the energy in that pulse can be unerringly returned to the distant target from which the return was received. (Bearden, 1988, 285)

What a time-reversed wave does is allow for a channel to be opened up in a certain sense from the object to the radar, radar sends out a signal, it is echoed back by object, then another wave is sent back directly to the target and not to any other coordinates, which is also akin to Ahronov-Bohm Effect monitoring we shall read about in later chapters as developed by the Soviets. This would be one way to pump an auditory signal as example to a target but nobody else around the target will hear that signal. Holography, as we shall read about more in the next section, is something he brings up, which we shall also read about more in later chapters as well. It is important to note that he mentions holography in connection with time-reversed waves, as well as his drawing attention to the cross section of the target or object of surveillance.

Eyes as Radar

Previously, we read how the early Russian researcher Kazhinsky had formulated a connection to communication and the eyes. Recently, this conjecture of his has been given experimental ground through the work of Singh et al (2018). In their studies they find the eye to be a antenna capable of receiving microwave radiation, infrared, ultraviolet aside from the normal color spectrum of electromagnetic radiation we see. As Norseen noted, flashes of images, appear in the visual cortex through Thought Injection, the visual pathway is a major part of Thought Injection, he also has spoken of sending beams of light (LED) at a target to affect neuro-cognitive function, see Chapter 4. Yet, he was not the originator of this concept either as it was done in the Soviet Union long before Thought Injection made it’s mark in the national security world. Pribram is sighted as the originator of Norseen’s ideals of using holography, as we shall read there is real world applications of this developed by Kaznacheev.



(image- Wikicommons)

Pribram’s theories on holographic vision are recounted here:

> Three sorts of image representation are proposed to be used in the cortex: 1. the Gabor wavelets, rooted in dendritic webs, seem to be used for associative processes underlying visual cognition; 2. their Gabor coefficients represent neural-net's sparse codes which serve for automatic processing; 3. the spatial image, reconstructed in the extrastriate area, is those which is then consciously perceived "with shapes and colors". Because the third image representation is even perceptually projected back into external space, so that it coincides precisely with the original object, I propose that quantum holographic process is necessary, since neural nets cannot realize that alone. (Perus, 2010)

Earlier it was mentioned that Pribram was a source for the holographic background to Norseen's work, however, it should be mentioned that the use of holography was already developed in the Soviet Union. Holography is a visual field phenomenon as noted by a Russian researcher Kaznacheev in work initially begun by him in the 1960s. Again, it should be pointed out that the retina's cones and rods act as cavity resonators or as high-Q antennas. In his patent (Kaznacheev 2004) he and his team engineered a system to pass holograms into the visual cortex but not in the visual range so it is imageless holography, although can be modified to also send visual hologram, as he writes "the invention relates to the field of optics and is intended to create a hologram containing non-visualized physiologically significant information that can be used in medicine." (Kaznacheev, 2004). This method is described:

> Method 3: The holographic image reproduced from the transmission hologram according to option 3 is taken on a digital video camera, the contrast of the diffractive components is enhanced using computer programs, for example PhotoShop, the graphic image of the hologram is converted into a digital matrix containing information about the color components and their intensity, a comparative statistical analysis of the values of elements of numerical matrices of holograms with the presence and absence of non-visualized physiologically significant information (mean values, variances, Parsons correlation coefficient, covariance of digital matrix values). If there are significant differences, a conclusion is made about the presence of non-visualized physiologically significant information in the hologram.
> (Kaznacheev 2004)

This allows both the transmission and reception of holographic information in the form of a frequency-modulated luminous flux. The transmission of the holograms occurs in the 2.5Hz-3.5Hz, and 10Hz (Alpha) brain wave rhythms. When the brain is presented with a hologram containing non-visualized physiologically significant information triggered the activation of 10Hz Alpha, which is also mentioned by Norseen.

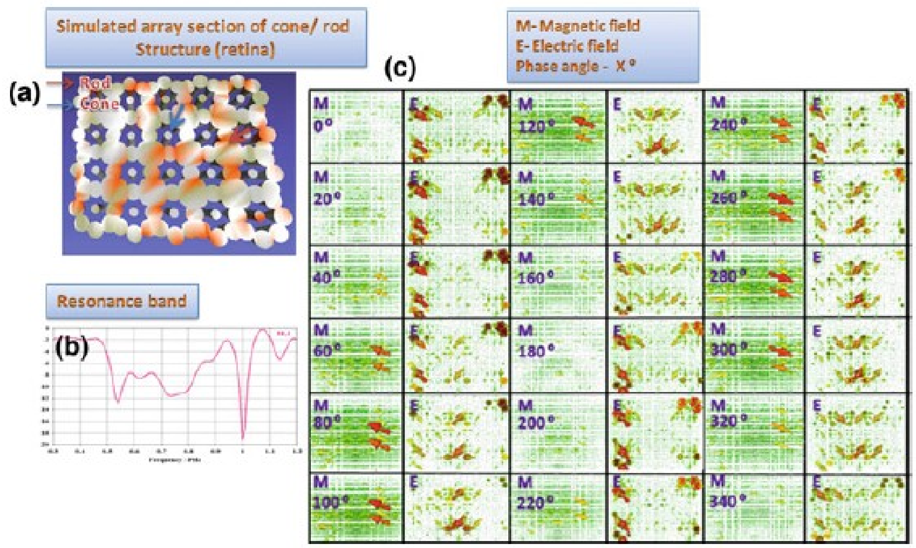
Eye as Antenna

Singh et al (2018) have brought out the physics of the human eye as a fractal antenna.

fractal antenna- electronic conduction and self-symmetry as in DNA, *self-similarity was one of the underlying requirements to make antennas frequency and bandwidth invariant*

One of the most basic self similar structures is that of the Fibonacci sequence which is found throughout nature but also the human eye, which gives the eye a fractal antenna property:

“Mainly the Fibonacci Sequence-based structure or the periodical array of basic physiological units (such as photoreceptors within the retina) is responsible for optimizing the signal communication in biological living systems” (Singh et al, 2018)



Singh et al 2018

“It has been argued that the proteins vibrate in the presence of electromagnetic signal like a cavity resonator….Protein synthesis is stimulated by electromagnetic fields of the specific frequency in the RF range….Since we now have evidence that proteins vibrate electromagnetically, we can revisit the electromagnetic interaction in the cells, considering the whole cell as a cavity resonator.” (Singh et al, 2018b)

Cavity resonators are needed to generate and receive microwaves among other wave frequencies, microwave cavity resonators are used to detect High Frequency Gravitational Waves (HFGW) as noted by Caves:

“The coupled electro-mechanical system consisting of a microwave cavity and its walls can serve as a gravitational radiation detector. A gravitational wave interacts with the walls, and the resulting motion induces transitions from a highly excited cavity mode to a nearly unexcited mode.” (Caves, 1976)

Singh has found that the structure of the eyes retina nano-center is a dipole antenna network. The interaction of a photon beam with this mechanism is considered:

> “If a rotation of the light wave underlies the laser emission then the possibility of helical electron transmission increases… …the network of cells acts as an array of helical antennas.” (Singh et al, 2018b)

This is important to note regarding that helical structures interact with Ahronov-Bohm Effect, so that in the human eye, this effect is felt and acted upon biologically. This dipole antenna of the eyes photoreceptors is modeled as an octagonal array, there is an octagonal order in rods and cones, with there being three types of cones s,m,l with wavelegnths at three separate magnitudes: r=400nm, g=550nm, b=700nm. This is somewhat reminiscent of radar used by wasps at three different magnitudes as well as noted also in another paper by Singh et al (2018).

We see how the human eye, not normally thought of in connection with Radar has certain radar like properties, which may include infrared transmission and reception like the same structural pattern of the wasp’s antenna which use infrared communication signals according to Singh et al. In later chapters, we shall see how the Soviets developed a radar like system using the Ahronov-Bohm effect and Spin-Entanglement which effectively are Quantum Radars.

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