

Report of an Anomalous Speech Products Experiment inside a Double Screened Room

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Abstract - An Anomalous Speech Products (ASP) experiment is described which took place in a laboratory screened against em radiation and also acoustically isolated. The subsequent treatment of the results through sound-processing is outlined, and the final analysis of the results through the use of a unique multiple-choice system is described. Comparative spectrograms of one ASP utterance and the same thing spoken in normal speech are provided to prove the physical reality of the results. From the results the conclusion is drawn that voices of no natural origin were received in the screened laboratory.

Keywords: screened room - ASP - Anomalous Speech Products.

Introduction

Early in 2003 an experiment took place which has considerable importance for us all. It has importance not just for the subject it addressed, but also for the study of the paranormal, and indeed for science in general.

A phenomenon popularly referred to as the Electronic Voice Phenomenon (EVP) (Raudive, 1971) has been known about for almost 50 years and during that time has been investigated by many researchers, amateur and professional.

Essentially EVP consists of recorded voices for which there is no natural explanation - the voices should not exist. In the early years of EVP it was convenient for skeptics to ascribe such voices to accidental pick-up of radio or environmental sounds.

There is a tendency to assume that the claims of skeptics are logical, rational and based on experimental evidence - purely because they exhibit orthodoxy.

In the early Seventies, with the support of the Perrot-Warwick Scholarship, David Ellis carried out research into EVP at the University of Cambridge - the university that in the 19th Century had given birth to the Society for Psychical Research.

The published record of this research, (Ellis, 1978), concludes with an EVP experiment being carried out in a room screened against all electro-magnetic (em) radiation - such a room being commonly referred to as a 'Faraday Cage'.

The Faraday Cage that was used belonged to a well-known UK electronics company, Pye - a member of their senior management being particularly interested in the phenomenon.

In the final pages of his report Ellis describes how during their experiment in the Faraday Cage a voice was recorded. Being a totally screened environment this could not be due to some radio broadcast or transmission.

It was concluded, however, that the voice must have entered the Faraday cage by acoustic means - it must have been the sound of someone's voice coming from outside.

And so the matter rested.

The Alpha Interface System

In 1982 the author made a discovery which involved the production of an EVP-type effect on a frequent basis using an interface system (later known as the Alpha). This involved immersing the subject in an RF field and monitoring changes in Electrodermal Activity as exhibited by fluctuations in the RF field picked up around the subject's body. The development of the system is more fully described in 'A Means of Producing the Electronic Voice Phenomenon Based on Electro-Dermal Activity' (MacRae, 2003).

The utterances obtained through the use of this system complied in every respect with the parameters of EVP utterances obtained by more traditional methods - but to differentiate it from the traditional methods and to distant it from some of the claims made for the phenomenon it is now called Anomalous Speech Products or ASP.

It should be made clear at the outset, to avoid confusion with any prior knowledge of the subject that the reader may have, that the views of the author on the mechanism whereby the voices arise and any further implications relating thereto do not necessarily correspond to those held by or attributed to the ASP community as a whole.

The initial design aim was to increase the probability of getting an utterance and this worked out quite well. One tended to discount the *significance* of what was heard in an utterance and concentrated instead on what could be observed, and in particular on what could be measured.

In this way the author was able to show that the utterances being obtained by the Alpha Interface System (AIS) could not logically, rationally or on the basis of experimental measurements be due to stray pick-up of any kind.

As an analogy - consider the effect on one's reception of a powerful local radio transmitter. At the frequency on which the local transmission occurs all distant transmissions will be rendered unobtainable - the phenomenon of "system capture" will apply to one's receiver and the effect on its automatic gain control will be such as to diminish any distant signals which might be picked up. Again, there is the effect of auditory masking whereby the stronger signal will "mask" the weaker - to the point where it may not be heard at all.

However this argument, (requiring some reasonable background knowledge of radio communications) was either not understood or not accepted by the less well informed skeptic.

Thus, a few years later, not having a Faraday Cage nor being able to obtain the use of one to prove the point, the author took the AIS equipment to what was then a small town in S where only Spanish broadcasts could be heard and on the rare occasion that there might be acoustic pick-up it would most probably be in Spanish.

The ASP obtained in this location did not produce the results expected by the skeptics. None of the utterances were in Spanish - all were in English.

But even such a straightforward demonstration did not seem to be generally understood or accepted.

Search for a Screened Room

Some years later it was decided to try again, and a search was undertaken to locate a facility that would ideally have both a Faraday Cage and an Anechoic Chamber (soundproof room) all in one.

Using such a facility one might finally demonstrate the appropriateness or otherwise of the conclusion reached by the Cambridge research.

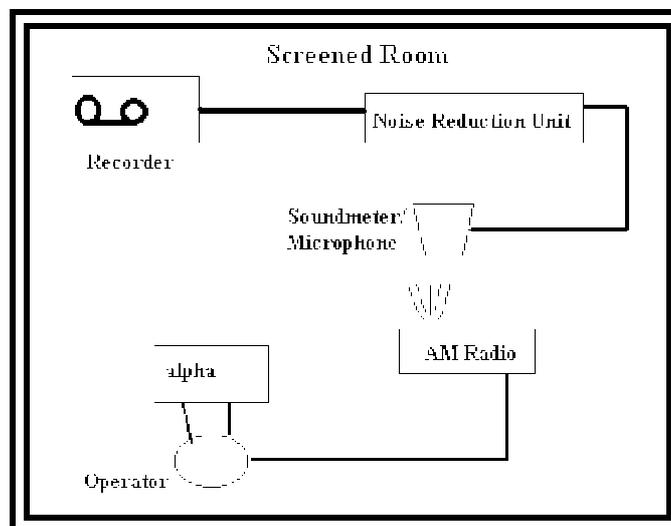
The importance of ASP does not - in the author's view - lie so much in the voices, but in the fact that the very existence of this phenomenon challenges the accepted and orthodox description of reality promulgated generally by scientists in the last Century.

This being so it was surely important to try to get this experiment done. The search for a Faraday Cage/anechoic chamber continued.

Eventually, the search resulted in contacting the Institute of Noetic Sciences who have such an em-proof and soundproof room at their Petaluma, California laboratories.

The Senior Scientist and the Director of Research of the Institute graciously allowed the use of their screened room facility.

To ease the way through Customs on the journey the parts were changed to individual commercially available units, such as a radio, two speech recorders and a laptop power supply. Two signed copies of the itemised list were printed on the author's company letterhead and presented to Customs at the departure airport. One copy of the officially stamped document was retained for re-entry. This change in the system taken to California and the reason for it are significant in that the change affected the results obtained, adversely.



The AIS taken to Petaluma consisted of the following component parts connected as shown in Figure 1.

Figure 1 Basic Alpha Interface System

Component Parts (including Spares and Post Production processing)

- Alpha unit
- AM Radio
- Speech recorders (2)
- Sound-meter/microphone (2)
- Noise Reduction System
- Laptop type power supply (2)
- Laptop computer with sound editing software
- Operator

Function of the Component Parts

Alpha Unit - to produce a signal based on around 1.2 MHz that is modulated by the interface system so as to produce sounds on the radio.

AM radio - to accept a signal from the pick-up loop section of the AIS in contact with the Operator and to convert it into sound representative of any modulation of the RF signal.

Operator - the person connected to the Alpha.

Sound-meter/microphone - used to set up the sound level produced by the radio to the right range, and to function as a broad response microphone for the Noise Reduction System.

Noise Reduction System - a commercially available (Timewave DSP-599zx) Digital Signal Processing unit that has the capability of reducing both random and non-random noise levels, and can be set to automatically adjust the gain to provide a stable output level, and which can also provide a band-pass filtering function so as eliminate or reduce out-of-band sounds. The output of this unit goes to the tape-recorder.

Recorder - to record the output of the Noise Reduction System.

Laptop power supply - to provide a dc supply for the Noise Reduction System.

Laptop computer - to replace the speech recorder in some tests and to provide analysis and editing of the sounds recorded.

One must include also, of course, the double-screened room belonging to the Institute (Radin, 2003). The IONS screened room is screened to Mil. Spec.

Experiments

The day after arrival was spent in setting up the equipment in the screened laboratory and doing some preliminary checks to make sure that no damage had occurred to the equipment in transit. It was noted that the radio silence within the screened room was total.

Over the ensuing weekend some preliminary analysis was done off-site of the recorded sounds using the editing software on the laptop. After the application of noise reduction software at least one word was heard .

The experiment proper was done the next day, Monday morning.

The equipment was switched on and checked over. Due to incomplete procedures the morning began with two aborted attempts to do the experiment . On the third attempt the full procedure was in place and the experiment was carried out.

The length of the experiment was approximately three minutes and after the author had said 'Start' loudly, until the experiment was complete no words were spoken. There was no other person present and no other source of noise, such as creaking chairs or ticking clocks, apart from a faint very low frequency sound from the ventilation - which was well below the speech band and would be eliminated by the Noise Reduction System - even if it had not been outside the recorder's bandwidth, anyway.

Outside the closed door of the screened room a member of the Institute staff was working and effectively prevented the possibility of any unauthorised entry during the experiment period.

On completion the equipment was dismantled and prepared for the return journey the next day.

Analysis

The tapes were transferred to the computer as sound files at 16 bits resolution and 22k sampling rate.

The sounds recorded in the Petaluma laboratory were now subjected to four optimisation steps.

- The computer's commercially available noise reduction software was applied to the sound files, with beneficial effect - some utterances were now beginning to show.
- Next the software's inherent digital filtering was used to accentuate the higher frequencies with a rising characteristic of + 3dBs per octave. ASP is commonly deficient both in consonants and in the upper part of the speech bandwidth.
- The editing software normalisation function was used to bring all samples up to a similar loudness level, and a slight amount of noise-gating was introduced to clean-up the signal some more.
- Finally, because much ASP is apparently spoken too fast, a variable speed tape recorder was used to slow the samples down. On playback all of the utterances were recognised although with a confidence factor of no more than around 75% even in the best cases.

Post Mortem

The post-mortem showed two main things.

- In re-designing the AIS to make use of commercially available parts in a reliable vehicle - the requisite instability had been largely designed-out leaving the system producing nothing more than a slightly varying squeal once the circuit had reached stability. It was this continuous squealing that produced the non-random noise component.
- The second thing the Post Mortem found was that the Random Noise Reduction produced by the DSP unit during the experiment was so "aggressive" - the unit can be set for nine different Aggressiveness levels - that it was not just reducing random noise it was deleting components from the speech - especially the fricatives which are largely composed of white-noise anyway - and as a result the output speech was noticeably deficient as compared with even normal ASP speech.

Pilot Multiple Choice Test

To demonstrate that the voice samples obtained were in fact that and not some psycho-acoustic or "audible Roscharch" effect the following test was designed and subjected to a pilot trial.

Normal standard ASP utterances were recorded using the AIS.

The utterances were processed to reduce noise and to maintain a constant loudness level.

Three of the utterances were selected and copied into one audio file - a short piece of silence separated each of the utterances.

This was sent out as an attached file to 30 email correspondents. The recipients of the email were then given a multiple-choice test.

For each utterance they were given a list of five possible interpretations and were asked to choose which one best suited the utterance they were listening to.

The email was "sent" only to the author's email address, but each of the recipients received a "blind copy". Thus, as far as any recipient knew, they were the only one to receive the test, thus ruling out the possibility of cross-correspondence between recipients.

When the results came in, the degree of uniformity and correctness of the responses was noticeable.

There being five optional responses per utterance the odds against getting the right response purely by chance are five to one.

For two utterances, (with a separate list of five possibilities for each), the odds against getting the right response for both would be 5 x 5 or 25 to 1.

There were actually three samples in the test, so the odds against getting all three responses right purely by chance would be $5 \times 5 \times 5$ or 125.

The general formula would n^m - where n is the number of samples and m is the number of optional responses assigned to each sample.

In this case the odds against are 5^3 , or 125 to 1.

Where two people are independently involved the odds against both of them getting all three responses right would be 125×125 or 15, 625. (1.5625×10^4).

The general rule is $(n^m)^p$, where p = the number of participants. This simplifies to $n^{m.p}$.

When the actual results were assessed in accordance with this it was seen that the odds were billions of billions to one against getting such a result by chance.

Three of the participants did not have English as their mother tongue - their mother tongues being Afrikaans, Polish, and Spanish. Thus what even this pilot study showed was that ASP could not possibly be due to a Roscharch effect - that in fact such a suggestion was quite untenable, being simply anecdotal dis-information based on pseudo-science.

Testing the Petaluma Results

In spite of the Petaluma results being so poor, it was decided to try the same sort of multiple choice test with them as had just been piloted in the above test.

As it carry out audiological or Articulation Index tests beforehand on the subjects, the previous pilot test was used as an index of comprehension and those with the top seven scores were asked to participate in this new much more difficult test.

Ten utterances were chosen from the Faraday cage responses and these were then divided up into two 3-utterance tests and one 4-utterance test. Each utterance was separated by a period of silence.

For each utterance there were five optional responses. The example shown below relates to the third utterance, utterance C.

C

1	Hello Margaret Walter
2	Send precision mishmash
3	Large economies depend
4	Dust envelopes desert
5	Bills accumulate Sunday

Table 1

The person listening to utterance C would then email their response giving the number of whichever option they thought was the best match. In this case they would be including their results for utterances A and B, also.

Creating the options is an extremely delicate and frustrating business. Each possible interpretation has to have *the same number of words* as the real interpretation. And each word in each possible interpretation has to have *the same number of phonemes* as the corresponding word in the real interpretation. And of course one has to avoid using *the same phonemes in the same places* as in the real interpretation.

Attention too has to be paid to the prosody - the rhythm and stress of the word or phrase - so that as far as possible all interpretations are equal.

In short, one has to make each optional interpretation indistinguishable from the real interpretation - but one must also avoid having interpretations so similar to one another that any one might be easily confused with the right interpretation. For example, 'Dogs with tails' and 'Frogs in pails' would be too close.

An email was sent to each panellist as a blind copy so that each person received a copy but no one knew that anyone else was doing the test.

The email contained basic instructions - advice to wear headphones if possible, advice that you could listen to each utterance as often as you liked, and instructions on how to send in responses. It also contained three tables of options - possible responses.

Like the example shown above in Table 1, each table showed five possible responses, and the listener was asked to choose the one that was the best match. There was one table for each of the three utterances. The utterances were sent as one audio file attached to the email.

The audio was formatted as Microsoft .wav audio sampled at the rate of 22k and with a resolution of 16 bits.

The same procedure was used in sending the second set of three utterances, and the final set of four utterances.

During this period the author avoided communicating with any of the participants as this would have introduced him into his own experiment - even if in a non-significant way.

The results of the multiple-choice test are as shown below. The ID column indicates the identity of each participant, and A to J identifies each of the 10 utterances used.

	ID	A	B	C	D	E	F	G	H	I	J
1	P101	Y	Y	Y	Y	N	Y	Y	Y	Y	Y
2	P102	N	nr	Nr	Y	nr	Nr	Y	N	Y	Y
3	P103	Y	Y	Y	Y	N	Y	Y	N	Y	Y
4	P104	Y	Y	Y	Y	Y	N	Y	Y	Y	Y
5	P105	Y	N	N	Y	Y	Y	Y	Y	Y	Y
6	P106	Y	Y	Y	N	Y	Y	Y	Y	Y	Y
7	P107	Y	Y	Y	N	Y	N	Y	Y	Y	Y

(Where Y = a correct choice, N = a wrong choice and nr = no response).

Table 1

The odds against this number of correct responses being obtained purely by chance are $5^{(55)}$ or about two hundred and seventy seven billion, billion, billion (2.77×10^{38}) to one.

The participants were not selected on the basis of academic qualifications, the author's personal knowledge of the person concerned, their belief in ASP or anything else of that nature.

The participants were essentially self-selecting (on the basis of their good performance in the first multiple choice test). The word "participant" rather than the word "panellist" is used here as the participants were,

- Not in touch with each other,
- Encouraged to believe that he/she was the *only* participant,
- Completely unknown to each other.

The results, therefore, particularly in view of the poor quality of the voices, are really quite gratifying.

One does not get that many correct listeners' responses without there being real sounds of real words present.

The onus is now on those who believe that ASP is a subjective phenomenon due to auditory fatigue, patterns within white noise, a Roscharch effect, and the like to base any such-assertions on experimental evidence.

Opinions, however strongly held, are not quite the same thing.

List of Participants in the Screened Room Voices Listening Tests

The author gratefully acknowledges the help given by all participants but particularly those who did the often dreadful Petaluma experiment tests. These were,

KC - California Attorney - USA

JPK - Artist and Photographer - England

JPM - Professor of Applied Linguistics - Canada

MO - University physicist, brain research - Poland

DR - Sound expert, TV presenter - England

DAS - Sales Clerk - USA

CV - Professor of Psychology - South Africa

The original tapes, processed files and response emails have been kept on file and if any future researcher wishes to contact a participant the author will be pleased to put them in touch, subject to that participant's agreement.

Note, if you will, that for two of the participants, CV and MO, their mother tongue was not English.

It had been planned to send some of the samples to a university forensic phonetician but having got in contact with several most of whom did not provide even the common courtesy of a reply, and as it would seem that the word has got out that this may have something to do with the paranormal it has been decided to leave them to their orthodox beliefs - on which, it must be said, their status, their careers and even their jobs may depend.

But the results having been so overwhelming the need for a professional opinion is not really essential. One person's opinion, no matter how Kosher they may be, does not weigh much against experimental evidence of the magnitude of two hundred and seventy seven billion, billion, billion, billion to 1 against chance.

Further Confirmation - Physical Evidence

Coming from a "hard science" background" one still likes to see evidence in physical form, however.

Accordingly, waveforms and spectrograms were examined.

The figures below are based on real physical events - in this case the actual sound waves of one of the utterances. These sound waves can be measured on a sound-meter - a physical instrument, or displayed as oscilloscope traces on a screen. In this case a PC with sound-editing software provided the waveform and spectrogram displays.

The patterns shown in Figures 2 and 3 are spectrograms, displays of how an utterance varies in terms of its frequency components and their intensities as the utterance proceeds through time from beginning to end.

The vertical axis is frequency, in the range 70Hz to 4000Hz. The horizontal axis shows the elapsed time - from the utterance beginning at the extreme left, at zero elapsed time, up to the end of the utterance at the right hand edge of the picture, corresponding to an elapsed time of 1.5 seconds.

The loudness of the sound is shown in terms of brightness - the type of display is a wavelet-based version using specific proprietary software. Seen in full color it is really quite impressive.

Spectrograms - also called sonograms or voiceprints - reward detailed study. The reader may notice that there is an overall similarity in that there are three main clumps of patterning in the two figures. Fig. 2 is ASP. Fig. 3 is normal voice.

What we are comparing here is an ASP utterance recorded in the Faraday Cage with the same utterance spoken by the author.

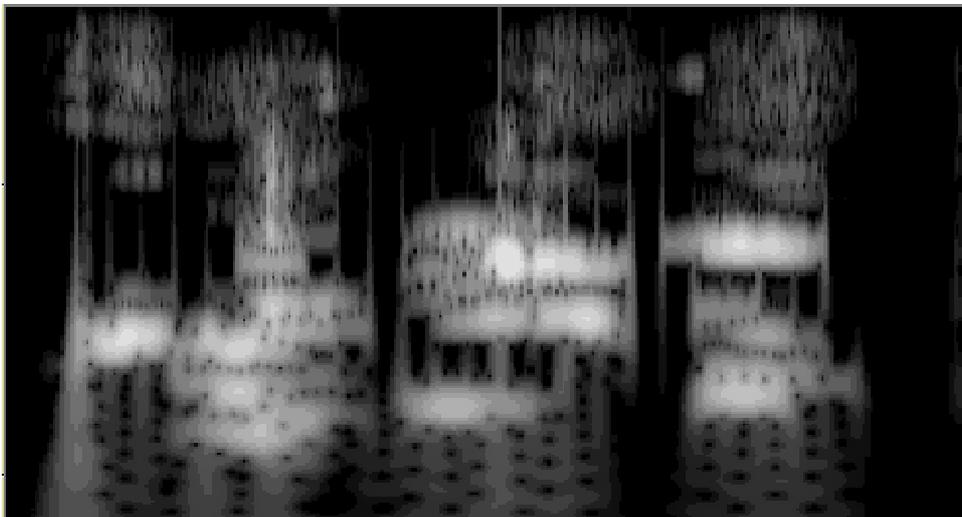


Figure 2 An ASP Utterance recorded in the Screened Room

In the ASP case it looks as though there are 4 clumps - the small piece right at the beginning seems to be separated - as compared with the first clump in normal voice which is much more integrated - the left-hand piece which seems to be separated in the ASP picture corresponds to the left part of the mirror image L-shape of the first clump in the normal picture.

This is probably due to prosodic differences - for example a phrase might be said as "We'regoing - NOW", or as "WE - aregoingnow".

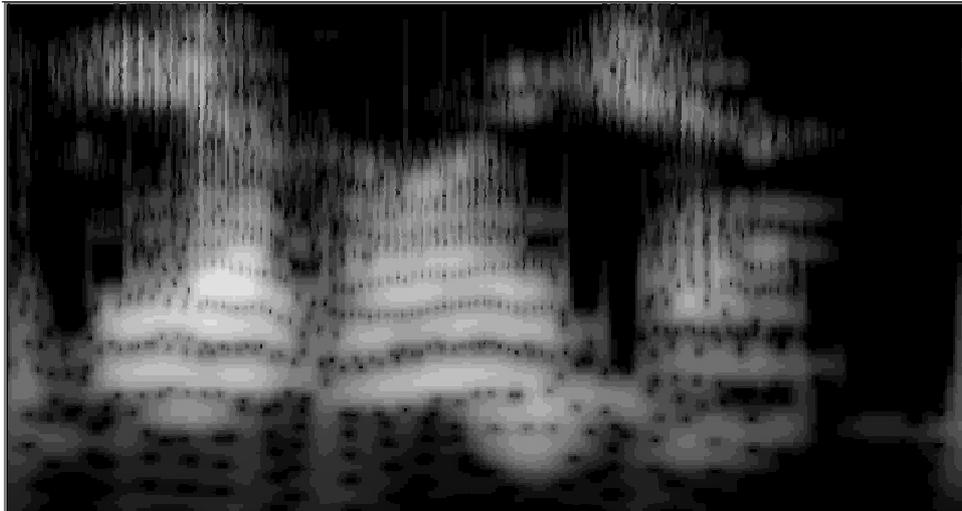


Fig. 3 is the spectrogram of the author's voice saying the words heard in the above ASP utterance.

The variations are due not just to prosodic differences but also to the dissimilar voices. And of course there are variations due to the fact that one utterance is ASP.

In Figure 3 the reader may notice thin "cloud-like" formations towards the top edge of the picture. These are almost absent from the ASP picture, being high frequency components - in common experience ASP generally tends to be deficient in high frequency components.

The final judgement - at least for someone with normal hearing - is to listen to it oneself.

The reader can do this by going to aspsite.tripod.com/test 1.

The reader also has the opportunity to try the test described in this paper - at least for the sample utterance posted to the website. Beside the sound sample there is a Table showing 5 possible interpretations. If the reader cares to email in their choice of "best-match" an email will be sent giving the percentages based on web-user's responses for each of the five options given.

There is a clickable email link just below the test on that page.

Conclusion

One's conclusion must inevitably be that even under adverse circumstances voices were received within a room screened against both em and acoustic waves under circumstances which precluded the generation of such sounds locally.

It follows therefore that the means whereby these sounds occurred in the screened room must have been in some way paranormal.

The ultimate verification lies in replication, of course, and it is believed that the experiment described above is fully replicable.

Hypothesis

To understand how it is that voices can appear to have come through metal walls and acoustically insulated wall is an almost inexplicable puzzle. To reach an hypothesis about it one may have to address such concepts as information, and meaning.

The hypothesis presented here will be described quite briefly, as essentially this is just a report of experimental findings. A fuller version of the hypothesis will be published in due course. However, elements of the hypothesis can be found in the author's paper on the subject of the A.I.S. (MacRae 2003).

The hypothesis proposes that an information dimension be added to those of Space and Time in the description of the continuum.

It is posited that this is an orthogonally disposed dimension and that our observation-based description of the universe must be considered as a resultant within those orthogonally disposed dimensions. Put more plainly - any observation is a composite resulting from an observer and the thing that is observed.

Taking a human example, looking out the window at the moment I observe on the other side of the bay a mountain.

Physical reality on a massive scale one might say.

Well, it depends on how you look at it - and not just *how*, but also *where* - and *when*.

To be precise, what I am actually observing is *the side of the mountain facing me*, (not the whole mountain) - within the bandwidth limitations of the *visual* spectrum - as it looks *at this moment*, (14:57, 17-03-03) - and that, while a real *observation*, is not the object itself. I am observing an *observation*, and that observation depends on the characteristics of the observer and of the object being observed.

An observation is a resultant - its component parts being Information and Physical reality.

We may therefore conceive of a Hilbert space - Information Space - to which one is connected - with the brain acting as a two-way physical/informational interface. Because this Hilbert space is not a physical space then communication within the Hilbert space does not impose a requirement for physical energy - unlike the case of a composite as above outlined which has both physical and informational properties.

The brain converts neural impulses into information and information into neural impulses.

The neural impulses affect an electrical parameter called admittance - which in turn affects the RF conducted and radiated.

The radiated RF is picked up, amplified and demodulated by the radio. The resultant audio (when cleaned up) is found to be a speech signal,

This hypothesis only applies to the AIS method of producing ASP.

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