

DIRECTION OF ELF-VLF ENERGY VERIFIED

Clifford E Carnicom
Santa Fe NM
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The direction from which the maximum VLF-ELF energy originates has been verified from this location, and it is in accordance with the expectation that the magnetic field lines of the earth are the primary carriers of this energy. A measurement test has been conducted with the loop directional antenna, and the results show that the maximum level of energy is received in the direction from magnetic north to magnetic south. It is anticipated and predicted that this same finding will occur from other locations in the nation and from around the globe. Research and analysis indicates that the HAARP facility is an increasingly likely candidate as a source of these emissions and energy.

The following statement from the 1987 patent by Bernard Eastlund, generally regarded as an accurate template for the HAARP project, is again presented as being especially relevant to the above finding:

"This invention relates to a method and apparatus for altering at least one selected region normally existing above the earth's surface and more particularly relates to a method and apparatus for altering said at least one region by initially transmitting electromagnetic radiation from the earth's surface essentially parallel to and **along naturally-occurring, divergent magnetic field lines which extend from the earth's surface through the region or regions to be altered."**

Additional information from a textbook on radio astronomy, although of a technical nature, is also important to understand why this test has been conducted:

If an electromagnetic wave travels through a plasma, there is a response by electrons at that same frequency. In addition, these electrons are further affected by any static magnetic field, e.g., the earth's magnetic field (DC). This magnetic field will cause the electrons to travel in curved, circular or helical paths, depending upon the orientation of the magnetic field. If the electromagnetic wave happens to be **circularly polarized**, the **amplitude** of the electron response **will depend upon the direction of the magnetic field**. Please refer to "An Introduction to Radio Astronomy", by Bernard Burke, Cambridge University Press, 2002 for additional information on this topic.

And lastly, the repeated references within the Eastlund patent to the HAARP transmissions of circularly polarized electromagnetic energy demonstrates the relevance of the test that has been completed:

"The region is excited by electron cyclotron resonance heating of electrons which are already present and/or artificially created in the region....this is done by transmitting circularly polarized electromagnetic radiation from the earth's surface... where a naturally occurring dipole magnetic field (force) line intersects the earth's surface.

A knowledge of cyclotron resonance (especially of physiologically important ions), circular polarization and HAARP technology will be of increasing importance to understand in relation to the aerosol operations.

At this time, the methods of the test will be presented:

The maximum electrical response of a small loop antenna, such as the one which has been developed, is in the plane of the loop antenna. The maximum MAGNETIC response is in a direction normal (perpendicular) to the

plane of the loop. The method by which the HAARP facility transmits energy along magnetic field lines of the earth suggests that the magnetic response of the loop antenna is of the greatest interest. In addition, a primary characteristic of an inductor, of which the small loop antenna is an example, is the storing of energy in the form of a magnetic field. A few statements about the nature of inductors is helpful to establish a foundation for this work:

**"It is the interaction of magnetic fields with a conductor that produces the effects we call inductance."
Basic Electricity, Van Valkenburgh, Prompt Publications 1992.**

**"Inductors ...store energy in the form of magnetic fields about their coils."
Practical Electronics for Inventors, Paul Scherz, McGraw Hill 2002.**

**"The ability of an inductor to vary its reactance as the voltage across its leads fluctuates makes it a particularly useful device in frequency-sensitive applications."
Practical Electronics for Inventors, Paul Scherz, McGraw Hill 2002.**

The small loop antenna is primarily an inductor. The orientation of the small loop antenna can be useful in detecting the direction of maximum magnetic interaction, as the normal to the plane of the small loop antenna produces the greatest magnetic response. As such, the small loop antenna has been rotated across a range of azimuths, and the magnitude of the AC response in millivolts has been tabulated. The ELF receiver was set to the frequency range of approximately 1-3KHz. The results are as follows:

Magnetic Azimuth of the Plane of the Antenna	Magnetic Azimuth of the Normal (perpendicular) to the Plane of the Antenna	AC (millivolts)
360	90	32.75
350	80	42
340	70	46.5
331	61	49
321	51	56
306	36	59
295	25	62
284	14	63
279	9	63
268	-2	69
230	-40	59
212	-58	59
180	-90	30
25	115	38

A negative azimuth in this case refers to an azimuth west, or counterclockwise of north. All azimuths are taken with a liquid filled magnetic hand compass graduated to 2 degrees. The data when plotted is of a clear cyclic nature. A least-squares trigonometric fit of the form $AC_{mv} = a * \sin (b * \text{Normal Magnetic Azimuth} + c) + d$ has been developed leading to the following result:

$$AC_{mv} = 16.34 * \sin (.0284 * \text{Normal Magnetic Azimuth} + 1.51) + 50.16$$

This function will reach a maximum under the following condition:

$$dAC / d\text{Normal Magnetic Azimuth} = 0$$

which leads to:

$$0 = a*b * \cos(b * \text{Normal Magnetic Azimuth} + c)$$

or

$$\text{Normal Magnetic Azimuth} = ((\pi / 2) - c) / b$$

or

$$\text{Normal Magnetic Azimuth} = ((\pi / 2) - 1.51) / .0284$$

or

$$\text{Normal Magnetic Azimuth} = 2.1 \text{ degrees}$$

which is essentially due magnetic north and well within the limits of the test equipment used. This value is within the least count of the instrument used for the test.

This leads us to conclude that the maximum magnetic response to the ELF-VLF fields under examination occurs when the normal to the plane of the small loop antenna is oriented towards magnetic north. It is predicted that this same finding will occur in other locations across the nation or globe. The pursuit of the association of these emissions with the HAARP facility is therefore reasonably justified with these findings.

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