OPINION PIECES

MADAR and the WOW Signal

by Fran Ridge

The signal recorded on the computer printout startled Dr. Jerry Ehman, who had been working on a SETI project at the Big Ear Radio Telescope at Ohio State University. It bore expected hallmarks of potential non-terrestrial and non-solar-system origin. The signal lasted for the full 72-second duration that Big Ear observed it, but it was not detected again. Amazed at how closely it matched the expected signature of an interstellar signal, Ehman circled the signal on the computer printout and wrote the comment "Wow!" on its side. This comment became the signal's name. This occurred at 11:16 p.m. EDT on August 15, 1977, but very few people were aware of it at the time.[1]

Two aspects of this signal immediately caught the attention of Ehman and Project Director John Kraus, who saw the results days later. First, 37 seconds was precisely the time it takes the Big Ear scanning beam to survey a given point in the heavens. Because of this, any signal coming from space would follow precisely the WOW signal's pattern; increasing and then decreasing over 37 seconds. This practically ruled out the possibility that the signal was the result of earthly radio interference. Second, the signal was not continuous, but intermittent. Kraus and Ehman knew that because Big Ear had two separate beams that scan the same area of the sky in succession, several minutes apart. But the signal appeared on only one of the beams and not on the other, indicating that it had been 'turned off' between the two scans, a strong, focused, and intermittent signal coming from outer space. Could it be that Big Ear had detected an alien signal?[2]

I knew nothing about the WOW signal in 1977. I was a UFO researcher and investigator for MUFON, and I was also the Director of the MADAR Project, which had about 50 team members. MADAR stands for "multiple anomaly detection and automated recording." At the time, we had only one site, at Mount Vernon, Indiana. We had been detecting geomagnetic anomalies and were trying to correlate them with UFO reports since 1970.

Fran Ridge in MADAR Control Room in 1977

Unlike the new MADAR-III used today, which uses a magnetometer and is operating in 120 locations around the globe, the first MADAR used a magnet variometer

1 Big Ear Radio Telescope at Ohio State University, BigEar.org official website. http://www.bigear.org/

2 Shostak, Seth, "Interstellar Signal from the 70s Continues to Puzzle Researchers," http://www.bigear.org/shostak_wow_20021205.htm

or compass with a small hole drilled in the north position and a focused light beam from a Radio Shack photo-electric relay system. When the compass needle moved, it allowed a light beam to strike the photocell and the circuit would energize the primary relay, which would trigger an array of equipment. The movement of the needle (1" long, 0.09" wide) necessary to trigger the array was between a half and a full needle's width, This corresponds to a minimum of 2.6° and a maximum of 5.2° angle of deflection. For a compass lying flat, this deflection can be converted into the horizontal field component of a magnetic anomaly at a given location and date. For Mount Vernon, Indiana, on August 15, 1977, the minimum horizontal anomaly needed to trigger the array was between about 940 nT and 1880 nT.[3]

When the array was triggered, a siren would automatically be turned on to alert the user. A recorder would note that the magnet variometer had been triggered and would also note any other triggering of the variometer. Another recorder would record all police and aircraft traffic transmissions. Lastly, a V-700 Geiger counter would measure radiation counts. Radiation background readings are mostly cosmic rays and other gamma radiation from minerals in the nearby earth. These background readings were 15 ± 5 cpm (counts per minute).[4] Triggering of the system just described will be referred to as an anomaly or anomalous reading in the remainder of this article.

Anomalous readings did not occur very often on the MADAR system. They averaged about one per year. Eight anomalous readings occurred during the time of initial operation from 1970 to 1976, with the most memorable caused by a lightning strike in 1974. Of 11 anomalous readings during the last 13 years of operation from 1978 to 1990, one was due to a bump against the system and an earthquake was the suspected cause of another.

The summer of 1977 was very different. Seven anomalies were recorded in a little over a month, (logged as 9 thru 15) beginning on July 10. All of the events occurred at night. On July 12, we had two anomalies. The first one occurred at 1:48 a.m. Background radiation was 18 cpm, which is normal. The second anomaly occurred at 4:35 a.m. and lasted 55 seconds; background radiation was 16 cpm. Later we learned of sightings of UFOs in Illinois and Kentucky around 2:10 a.m. – 22 minutes after our first anomaly. We obtained a signed statement from the local police department confirming they had monitored radio frequencies that described sightings of UFOs at Mayfield, Kentucky (within 85 miles of our site), and Mount Vernon, Illinois (60 miles to the northwest of our site).[5] No other details were available.

But a month later at 10:14 p.m. on August 15, we had a real "doozy." It was a three-minute 29-second event – the longest and most intense electromagnetic anomaly ever recorded at our MADAR site. The variometer had swung back and forth 18 times! Not only that, but the CD V-700 Geiger counter had recorded an average reading of 30 cpm. After the event, the readings settled down to 15 cpm, which was normal background for that time period. In the 1970s, a 100 percent increase was considered significant. In today's world, after more than 500 atomic bomb tests all over the world and all the fallout, and remnants from nuclear disasters still floating around us, 2½ times is now considered significant.[6]

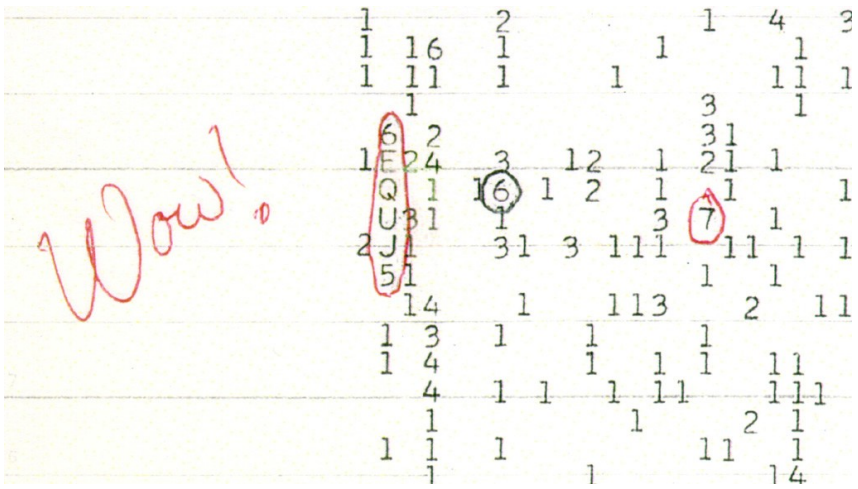
3 personal communication, S. Little and R. Powell, March 2022

4 The MADAR Project website. https://madar.site/

5 Signed statement by Mount Vernon Police Department, MADAR files. https://www.nicap.org/madar/reports/madar10_O.jpg

Three decades later, on August 2, 2010, we were shocked to learn about the WOW signal. The story of the strange signal, which hadn't even made the "news" until 1997[7], had been "revisited" in 2007[8], the 30th anniversary of the event. The signal had been received in Ohio at 11:16 pm EDT on August 15, 1977. Unknown to them, our MADAR event had occurred in southwest Indiana at 10:15 pm CDT, 300 miles away. The stunning reality was, with the difference in time zones, the two events had occurred at the same time. This was either related or one hell of a coincidence!

In 2007, Ehman had updated the findings and his opinions on the WOW signal. He wrote: "Thus, since all of the possibilities of a terrestrial origin have been either ruled out or seem improbable, and since the possibility of an extraterrestrial origin has not been able to be ruled out, I must conclude that an ETI (extraterrestrial intelligence) might have sent the signal that we received as the Wow! source."



WOW! Signal by Dr. Jerry R. Ehman

Two slightly different values for its frequency have been given: 1420.356 MHz[9] and 1420.4556 MHz[10]. The frequency 1420 MHz is significant for SETI searchers because, it is reasoned, hydrogen is the most common element in the universe, and hydrogen resonates at about 1420 MHz, so extraterrestrials might use that frequency to transmit a strong signal. The frequency of the signal matches very closely with the hydrogen line, which is at 1420.40575177 MHz. The two different values given for the frequency of the signal (1420.356 MHz and 1420.4556 MHz) are the same distance apart from the hydrogen line, the first being about 0.0498 MHz less than the hydrogen line, and the second about 0.0498 MHz more. the bandwidth of the signal is less than 10 kHz (each column on the printout corresponds to a 10 kHz-wide channel; the signal is only present in one column).

The Ohio State University WOW signal came in on channel 2, one frequency out of 50 being monitored. That means it couldn't have been a natural "disturbance"! As Ehman even stated, such a disturbance would have shown up in all or most of the frequencies. As an investigator involved in deliberate

6 Mineral Labs, background radiation standards, Radiation Network website. https://radiationnetwork.com/

7 "Forum: Wow! Was That ET?, *New Scientist*, August 1997. https://www.newscientist.com/article/mg15520946-800-forum-wow-was-that-et/

8 30th Anniversary of the "WOW!" Signal, 2007, BigEar.org. http://www.bigear.org/Wow30th/wow30th.htm

9 Kraus, John, Director, Ohio State Radio Observatory 31, January 1994, "The Tantalizing WOW! Signal"

10 Ehman, Jerry R., February 3, 1998. "The Big Ear Wow! Signal. What We Know and Don't Know About It After 20 Years"

attempts to detect UFOs[11], I had been reluctant to try to contact Dr. Ehman. I had always hoped somebody he knew and respected would have seen my paper, which I wrote in 2010, a detailed six-page NICAP (National Investigations Committee on Aerial Phenomena) paper with graphics and audio links.[12] As recently as September 2020, Jerry Ehman stated in an *Astronomy Magazine* article[13], "No conclusion was ever possible other than it certainly had the potential of being a signal from extraterrestrial intelligence."

MADAR had picked up an anomaly at the same time as the WOW signal, so what was going on in the summer of 1977, and specifically on August 15? I believe what happened that summer was truly anomalous and important.

Going forward, I propose this additional information could be gathered:

1. Recheck the data from the U.S. Geological Survey to see if they have any records that might shed some light on other incidents for August 15.
2. Contact Jerry Ehman while participants in the study are still alive and well.

For a more detailed version of this paper go to http://www.nicap.org/ncp/ncp-ridge6.htm

11 "Project MATCH Report, Four-Year Report." http://www.nicap.org/match/Annual-Project-MATCH_Reports/Annual-MADAR-Report.htm

12 "MADAR-15 & the 'WOW!' Signal", NCP-19 paper, Fran Ridge author. http://www.nicap.org/ncp/ncp-ridge6.htm

13 Ehman most recent statement in *Astronomy Magazine*, September 2020 issue. https://astronomy.com/news/2020/09/the-wow-signal-an-alien-missed-connection