



Microwave Surfing

The Hum? Hmm ...

■ Rajeev Bansal

*The music in my heart I bore,
Long after it was heard no more.*

William Wordsworth (1770–1850)

These lines from Wordsworth's poem "The Solitary Reaper" appeared in a column [1] I wrote back in 2004 after the U.S. Navy terminated its US\$400 million Project ELF by silencing the twin ELF (30–300 Hz) transmitters located in Michigan and Wisconsin. They came back to my mind recently when I read in an article [2] that many people around the world report hearing a mysterious hum:

"The Hum" refers to a mysterious sound heard in places around the world by a small fraction of a local population. It's characterized by a persistent and invasive low-frequency rumbling or droning noise often accompanied by vibrations. While reports of "unidentified humming sounds" pop up in scientific literature dating back to the 1830s, modern manifestations of the contemporary hum have been widely

reported by national media in the United Kingdom, the United States and Australia since the early 1970s.

According to the article, some people connected the hum to the ELF- and VLF (3–30 kHz)-based communication systems adopted by the Navy [2]:

Some Hum investigators suspect that there's a global source responsible for the Hum worldwide. Deming's research, considered close to authoritative in the Hum community, suggests that evidence of the Hum corresponds with an accidental, biological consequence of the "Take Charge and Move Out" (TACAMO) system adopted by the US Navy in the 1960s as a way for military leaders

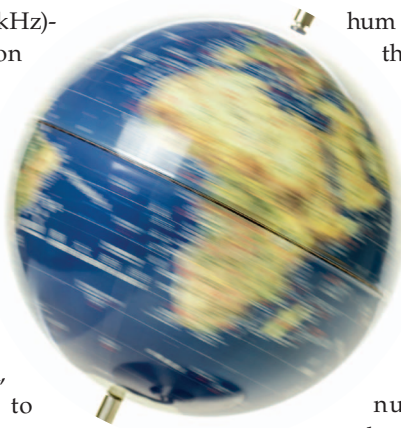
to maintain communications with the nation's ballistic missile submarines, land-based intercontinental ballistic missiles, and long-range bombers during a nuclear war.

I had never heard about this hum until I read about it in the link [2] sent to me earlier this week by one of my daughters. So I decided to do a little bit of online fact-checking first. There was, indeed, media coverage including an NBC News article [3], a *Wikipedia* entry with numerous references, and a "world hum map" [4].

The ELF connection to the hum even worked itself into a 1998 episode of the TV show *The X Files*, an excerpt from which was played during a 2011 interview on NPR [5]:

Gillian Anderson (as Agent Dana Scully): Now, ELF fields have been shown to produce biological effects in human tissue, inducing electrical currents, altering chemical reactions.

David Duchovny (as Agent Fox Mulder): Not to mention that as a potential weapons application,



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it's been referred to as electrical nerve gas or may be behind the so-called Taos hum.

Curiously, in browsing through the literature on the hum, I did not spot any reference to the microwave auditory effect [6], one of the few biological effects that is well understood (although, in my opinion, it has nothing to do with the reported hum):

The hearing of microwave pulses is a unique exception to the airborne or bone-conducted sound energy normally encountered in human auditory perception...[T]he microwave pulse, upon absorption by soft tissues in the head, launches a thermoelastic wave of acoustic pressure that travels by bone conduction to the inner ear. There, it activates the cochlear receptors via the same process involved for normal hearing. Aside from tissue heating, microwave auditory effect is the most widely accepted biological effect of microwave

radiation with a known mechanism of interaction: the thermoelastic theory.

So what is the real the origin of the hum heard around the world by some people? As it happens, there was at least a theoretical breakthrough of sorts in 2015. As *The Independent* (U.K.) reported in April 2015 [7],

Scientists have confirmed the cause of a strange humming noise that emanates from the Earth and has baffled people for more than forty years—and was even a factor in one reported suicide...

However, the search for the truth could now be over as researchers claim that microseismic activity from long ocean waves impacting the sea bed is what makes our planet vibrate and produces the droning sound.

"The pressure of the waves on the seafloor generates seismic waves that cause the Earth to oscillate," said Fabrice Ardhuin, a senior research scientist at

Centre National de la Recherche Scientifique in France.

Ardhuin, along with his colleagues Lucia Gualtieri and Eléonore Stutzmann of the Paris Institute of Earth Physics, used computer models of the wind, ocean, and seafloor to identify the type of waves causing the incessant "hum." Their work appeared in the online journal *Geophysical Research Letters* [8]. Ardhuin noted [9], "We have made a big step in explaining this. Now we know where this ringing comes from, and the next question is: what can we do with it."

In other words (and I am sorry to have to say this), there is no relief in sight yet for the people "afflicted" with the humming sound.

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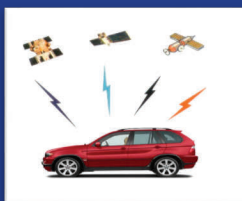
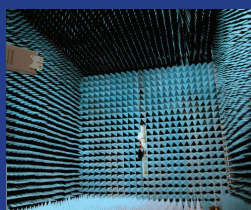
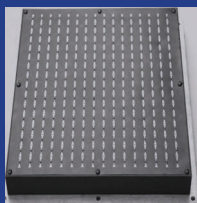
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