

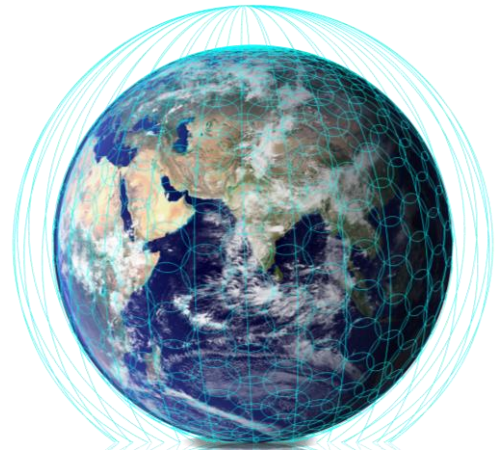
PLANETARY EMERGENCY

The Earth needs your help. Now.

Many are the assaults on our planet. The oceans—Jacques Cousteau said it already in 1970—are dying. The majestic wilderness is no more. The very oxygen we breathe is being converted to carbon dioxide.

Others are wrestling with those problems, and they are not going to be solved overnight. But there is one that must be: we must leave space alone.

On March 29, 2018, the Federal Communications Commission gave its approval to SpaceX's plan to launch an unprecedented 4,425 satellites into low orbit around the Earth. And that's only the beginning. SpaceX has applied to the FCC to increase the number of satellites to 12,000 in order to provide "ultrafast, lag-free Internet" to every square inch of the earth. 5G from space. SpaceX's CEO, Elon Musk, has announced his intention to begin launches in 2019, to begin operating as soon as he has about 100 satellites in orbit, and to have the first 800 satellites up and running in 2020. The name of SpaceX's project is "Starlink."



The global electrical circuit, which sustains all life, is about to be seriously disturbed unless we act.

Recent History

In 1997, in my first book, *Microwaving Our Planet*, in the last chapter, titled "The Danger from Satellites," I wrote: "The proliferation of satellites we are about to witness—unless this world wakes up soon—is mind boggling, and nobody seems to have considered that popping thousands of them up there like so much confetti might have consequences for our atmosphere and our climate." I wrote about the expected ozone loss; the destruction of the Van Allen belts; global warming from the addition of water vapor to the stratosphere; toxic wastes; groundwater pollution; space junk; microwave radiation; and the vandalism of the night sky. My 1997 book is posted here, courtesy of the Spanish website AVAATE, one of the best websites on this issue: www.avaate.org/IMG/doc/Microwaving_Our_Planet_firstenberg.doc

A year later the radiation problem asserted itself. On September 23, 1998, the world's first satellite phones became operational. Service was provided by 66 satellites in low orbit around the Earth, launched by the Iridium Corporation. They unleashed a new kind of rain that turned the sky red and emptied it of birds for a couple of weeks.

A six-nation telephone survey was done of electrically sensitive people, support groups, and nurses and physicians serving this population. The results: 86% of electrically sensitive

people and a majority of patients and support group members became ill on Wednesday, September 23 exactly, with typical symptoms of electrical illness including headaches, dizziness, nausea, insomnia, nosebleeds, heart palpitations, asthma attacks, ringing in the ears, etc. Follow-ups revealed that some of these people were acutely ill for up to three weeks. Some were so sick they weren't sure they would live. In the United States the national death rate rose by 4% to 5% for two weeks. During those two weeks, very few birds were seen in the sky and thousands of homing pigeons failed to return home in pigeon races throughout much of the country. This was all documented in [No Place to Hide, Vol. 2, No. 1, Feb. 1999, pp. 3-4.](#)

The second satellite service, Globalstar, began commercial service on Monday, February 28, 2000. Widespread reports of nausea, headaches, leg pain, respiratory problems, depression, and lack of energy began on Friday, February 25, the previous business day, and came from people both with and without electrical sensitivity. See [No Place To Hide, Vol. 2, No. 3, March 2000, p. 18.](#)

Iridium, which had gone bankrupt in the summer of 1999, was resurrected by a contract with the United States Armed Forces. On March 30, 2001, commercial service resumed. Again the sky turned red. Again came reports of nausea, flu-like illness and feelings of oppression. But the events that made the news were catastrophic losses of race horse foals that were reported throughout the United States and as far away as Peru. On June 5, 2001, Iridium added data and Internet to its satellite phone service. Again came widespread reports of nausea, flu-like illness and oppression, and this time also hoarseness. See [No Place To Hide, Vol 3, No. 2, Nov. 2001, p. 15.](#)

Additional details are provided in chapter 17 of my new book, *The Invisible Rainbow: A History of Electricity and Life*.*

Between 2001 and now, our skies have not essentially changed. Iridium and Globalstar, operating 66 and 40 satellites respectively, are still the only providers of satellite phones. The amount of data raining on us all from space is still dominated by those two fleets. The predicted fleets of thousands of satellites have not materialized. But they are about to now, unless we stop them. Everything we know and love is at stake—not just hawks and geese, pigeons and race horses, not just the human race, but life itself. This is a mortal threat not just to our children and grandchildren, but to all of us, immediately, within two years.

The Details

The biggest threats are from SpaceX and OneWeb, which have similar applications before the FCC. SpaceX's 12,000 satellites will operate in two constellations, at 700 miles and 210 miles in altitude. They will operate at millimeter wave frequencies and they will be phased arrays. Each satellite will have thousands of antenna elements that will work together to aim highly focused, steerable beams at any desired point on the surface of the earth. Each beam from the 4,425 satellites already approved at the 700-mile height would have a maximum effective radiated power of up to 8,800 watts. The revised application for 12,000 satellites is requesting an increase to 5,000,000 watts per beam (for the upper constellation of 4,425 satellites) and 500,000 watts per beam (for the lower constellation of 7,518 satellites). The satellites will communicate

both with individual users and with gateway earth stations, of which there will be several hundred just in the United States.

OneWeb's founder and Executive Chairman is Greg Wyler. So far, OneWeb has applied to the FCC for only 4,540 satellites, but it is partnering with Airbus, which will build the satellites; Blue Origin, a subsidiary of Amazon, which will provide the rockets; and Virgin Galactic, which will launch them. Its investors include Qualcomm, Hughes Network Systems, Intelsat of Luxembourg, Marker LLC of Israel, Grupo Salinas of Mexico, SoftBank of Japan, Bharti Enterprises of India, and Coca-Cola. It received a license from the FCC for 720 low-orbit satellites in June 2017, but has already sold most of their capacity to Honeywell and other companies. Honeywell plans to use satellite transmissions to supply fast Internet to business, commercial, and military aircraft worldwide. On January 4, 2018 OneWeb filed an application for an additional fleet of 2,560 medium-orbit satellites, and on March 19, 2018 it filed an application for 1,260 additional low-orbit satellites. It is now touting its enterprise as an essential element of the worldwide rollout of 5G technology. Like SpaceX, OneWeb's satellites will have antennas in phased arrays and use the millimeter wave spectrum. Their maximum effective power will be 6,000 watts. OneWeb intends to launch 36 satellites every 21 days beginning in the last quarter of 2018, and to begin service with the first few hundred satellites in 2019.

Boeing, which has its own plans for a fleet of 2,956 low-orbit satellites, and already has FCC approval for them, may now be backing OneWeb. In December, Boeing asked permission from the FCC to transfer its license for the 2,956 satellites to a company named SOM1101 LLC. Greg Wyler, the founder of OneWeb, is the sole owner of SOM1101.

A fourth company, Telesat Canada, was granted an FCC license on November 3, 2017. It plans to have a minimum of 117 satellites up and running by 2021. It intends to add satellites "as needed" to increase capacity. These satellites will also be phased arrays and they will also be for global internet to "unserved and underserved" communities, businesses, governments and individuals. They will have a maximum effective power of 8,000 watts.

Iridium, in an effort to compete with all these new companies, is presently in process of replacing its original fleet with a new fleet of 66 satellites called Iridium Next that will offer additional services.

These five companies together have approved and pending applications before the FCC for almost 20,000 low and medium orbit satellites to provide Internet to the world from space.

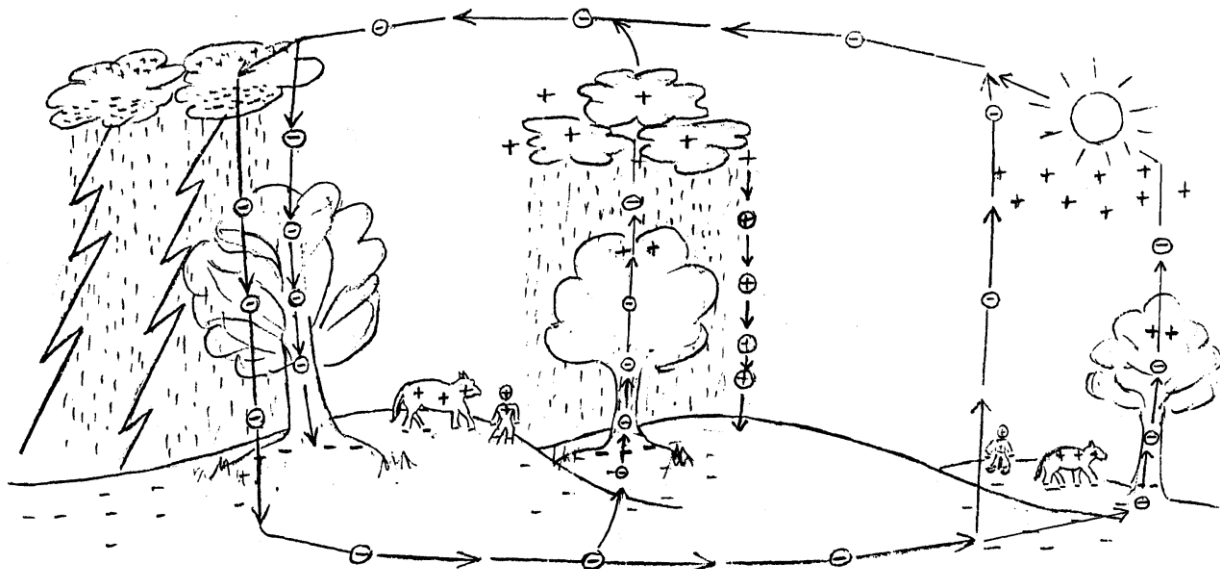
If 66 satellites providing only voice communication caused widespread illness and mortality among birds, horses, and people, what will a 20,000-satellite Internet-in-the-Sky do to us all?

The Way to Understanding

The original Iridium satellites were (and are still) at 1,000 watts in effective power and 483 miles in altitude. If a 1,000-watt tower were to be placed on a mountaintop that was 483 miles from the nearest person, no one would be alarmed. Why, then, worry about satellites in

space? Five million watts is a lot scarier, but even a 5-million-watt beam from 700 miles away will produce a power level of only 13 picowatts (trillionths of a watt) per square centimeter on the ground, a level that is far below the levels most of us are exposed to already from WiFi, cell phones, and cell towers.

The answer has to do with what atmospheric physicists call the global electrical circuit, and with what Chinese medicine calls qi. Electricity is not only something “out there” that powers our lights and machinery, it is the force that orchestrates growth and healing and keeps us alive. The global electrical circuit flows through the earth, up to the sky in thunderstorms, through the ionosphere, and back down to earth through the atmosphere and through our bodies. The current enters our bodies through the top of our head, circulates through our acupuncture meridians, and reenters the earth through our feet. In addition to direct current, it contains 8 Hz, 14 Hz, 20 Hz, 27 Hz, and 34 Hz components. These ELF frequencies are the Schumann resonances, and are identical to the brain wave frequencies of every animal. It also contains VLF frequencies. These are generated by lightning, vary seasonally, and regulate our annual biorhythms. We pollute this circuit at our peril.



Reproduced from *The Invisible Rainbow: A History of Electricity and Life* (2017)*
Chapter 9, “Earth’s Electric Envelope”

The strength of the atmospheric electrical current is between 1 and 10 picoamperes (trillionths of an ampere) per square meter. Dr. Robert Becker found that 1 picoampere is all the current that is necessary to stimulate healing in frogs. (R. O. Becker and G. Selden, *The Body Electric*, New York: Morrow 1985, p. 142; R. O. Becker and A. A. Marino, *Electromagnetism and Life*, Albany: State University of New York Press 1982, pp. 49-51). It is these tiny currents that keep us alive and healthy.

The experiences of astronauts are a clue to the importance of the global electrical circuit to terrestrial life. The International Space Station is not completely outside of it; the Schuman resonances are clearly detectable even at that altitude, but they are greatly diminished. In the Space Station, astronauts’ circadian rhythms are disrupted. See John R. Ball and Charles H.

Evans, Jr., editors, *Safe Passage: Astronaut Care for Exploration Missions*, National Academies Press 2001. And Russian authors have noted that “a decrease in all physiological processes” occurs during space missions and that these changes are “identical to those that occur during the process of aging on Earth.” (Irina M. Lirina et al., “Protein expression changes caused by spaceflight as measured for 18 Russian cosmonauts,” *Nature, Scientific Reports* 7:8142 (2017)). It is doubtful that human beings could long survive if completely removed electrically from Earth, for example in a colony on Mars such as Elon Musk is also contemplating.

Power Line Harmonic Radiation

Another piece of the puzzle is provided by research that has been done at Stanford University and elsewhere on the properties of the ionosphere and magnetosphere—the regions of space hundreds to thousands of miles above our heads that contain mostly electrons, protons, and other electrically charged ions.

It was discovered more than forty years ago that ELF and VLF radiation from all of the power lines on earth is reaching the ionosphere, and the magnetosphere above it, where it is being amplified up to one hundred thousand-fold by interaction with electrons. As a result, the earth’s electromagnetic environment has been changed. The behavior of the magnetosphere, the structure of the Van Allen belts, the values of the Schumann resonances, and even the weather here on earth, have been altered. This phenomenon is called “power line harmonic radiation.”

It was further discovered that the radiation from VLF radio stations is *also* amplified tremendously in the magnetosphere—so much so that a radio signal of 0.5 watts sent from an antenna in Antarctica can be detected by a receiver in northern Quebec.

Dirty Electricity on the Global Circuit

What does this have to do with SpaceX and OneWeb? Or, to rephrase the question, if a single half-watt radio station broadcasting from the earth has a measurable effect on the magnetosphere, what effect will 20,000 satellites, some located directly in the ionosphere and some directly in the magnetosphere, each blasting out up to five million watts—what effect will that have on life below?

The answer has to do with the fact that the satellite signals—like all wireless signals today—will be pulsed at ELF and VLF frequencies. That is how the data will be sent. Like an AM radio, the ionosphere and magnetosphere will demodulate, or extract, the ELF and VLF components, and then amplify them tremendously. Until now nobody has looked for these effects from satellites. But a Stanford physicist with whom I have been corresponding explained why this could happen and showed me how to estimate the minimum power level that would be necessary. Iridium had enough power, and the new satellites will have more than enough power: as a rough estimate, the five-million-watt SpaceX beams will contain enough energy up to a distance of 135 miles from each satellite for their ELF/VLF components to be demodulated by the ionospheric plasma and then amplified in the magnetosphere.

The result is similar to how dirty electricity gets onto house wiring. All of the electronic equipment—dimmer switches, fluorescent lamps, computers, cell phone chargers, etc.—that are plugged into our walls produce electronic noise that travels on the wiring, radiates into our homes, and makes us sick.

Except that now the dirty electricity will get onto our *bodies*’ wiring. The noise from 20,000 satellites that are plugged into the ionosphere and magnetosphere will pollute the global electrical circuit that *we* are all plugged into. It will kill us and it must be stopped.

It is not only the number of satellites but the number of customers they will serve that is the problem. A cell tower is more harmful than a radio station because instead of emitting just one signal it emits hundreds. Iridium is so impactful not only because it has 66 satellites but because it serves more than a million customers. Because of Iridium and Globalstar, standing barefoot on the earth is no longer as healthful and invigorating as it once was, anywhere on the planet. Grounding yourself increases the flow of qi through your body, but the qi has electronic noise on it. SpaceX’s initial goal is to sign up 40 million subscribers. If OneWeb signs up another 40 million, and one-tenth of the subscribers are online at any given time, electronic noise from 8,000,000 additional signals, to start with, will pollute the global circuit.

There are other serious environmental impacts from the intensive use of space, some of which I outlined in my first book. For example, the rockets of both SpaceX and OneWeb will burn kerosene. Burning kerosene in space produces prodigious amounts of black soot, which accumulates in the stratosphere. Black carbon absorbs so much solar energy that its contribution to global warming is two million times greater per unit mass than carbon dioxide. Just 35 launches of SpaceX’s Falcon Heavy rocket per year would produce an amount of warming roughly equal to the amount of warming produced in a year by the world’s one billion cars. I am extrapolating from the estimates of Martin Ross of the Aerospace Corporation, which were made in 2012 when there were 25 launches per year of much smaller rockets. (M. N. Ross and P. M. Sheaffer, “Radiative forcing caused by rocket engine emissions,” *Earth’s Future* 2: 177-196 (2014)).

As Ross points out, the problem of black soot could be solved, or at least reduced, by using a different type of fuel. The radiation problem, however, by definition cannot be solved, because the radiation is the product. The decision-makers and investors in these companies must be made to understand that they are playing with fire, and that what they are planning to do within the next two years will have fatal consequences.

The key players are:

For SpaceX:

Chief Officers

Elon Musk, CEO
Gwynne Shotwell, President and COO
Bret Johnson, CFO

Residence

Bel Air, CA
Rolling Hills Estates, CA
Los Angeles area

Board of Directors

David S. Kidder, CEO of Bionic Solutions	Rye, NY
Luke Nosek, founder and partner of Gigafund	San Francisco, CA
Antonio Gracias, founder, Valor Equity Partners	Chicago, IL
Donald Harrison, Google's president of global partnerships and corporate development	Mountain View, CA
Kimbal Musk (Elon's younger brother)	Boulder, CO
Barry Schuler, advisor	Napa, CA

Lead Investors

Fidelity Investments (Abigail Johnson, CEO)	(Boston, MA)
Google (\$900 million)	
Nihal Mehta, founding partner of Eniac Ventures	New York, NY
Bracket Capital (Yalda Aoukar, CEO)	(London)

For OneWeb:**Board of Directors**

Greg Wyler, Founder and Chairman	Stuart, FL
Eric Béranger, CEO	Paris, France
Thomas Enders, CEO of Airbus	Toulouse, France
Paul E. Jacobs (also on board of Dropbox)	Sacramento area
Alex Clavel, Head of Corporate Finance of SoftBank	Palo Alto, CA
Ohad Finkelstein, Co-Founder and Partner of Marker LLC	Israel
Ricardo Salinas, Founder and Chairman of Grupo Salinas	Mexico City

Large Investors

Stephen Spengler, CEO of Intelsat	Luxembourg
Jeff Bezos, CEO of Amazon	Medina, WA
Richard Branson, CEO of Virgin Galactic	British Virgin Islands
Sunil Mittal, CEO of Bharti Enterprises	New Delhi, India
Dean Manson, Executive Vice President of Echo Star	Englewood, CO

Biggest Customer

Honeywell (Darius Adamczyk, CEO)	(Morris Plains, NJ)
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Owner of Satellite License

Boeing (Dennis Muilenburg, CEO)	Collinsville, IL
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All these people have families and children and have a stake in the future of the Earth. Some—for example, Kimbal Musk and his wife, Christiana—are long-time advocates for the environment and investors in environmental causes.

Please contact me if you want to help. What is needed is a team of dedicated people who can raise funds, mobilize scientists, petition governments, and call and meet with environmental organizations.

Also please contact me if you know any of the gentlemen or ladies I have listed above, or if you know someone who can get us an audience with one of them. All we need is one. An opening into that community of billionaires, to begin a dialogue that will save this planet.

Arthur Firstenberg
May 14, 2018

* *The Invisible Rainbow* is available for sale at www.cellphonetaskforce.org.