Ms. Marlene H. Dortch, Secretary
Federal Communications Commission
445 12th Street, S.W.
Washington, D.C., 20554

Re: Informal Objection Under Section 5.95 to Application of Space Exploration Technologies Corp. ("SpaceX") Application for Experimental License for the MicroSat-1a/b Test and Demonstration Mission, File No. 0356-EX-PL-2015

Date: January 16, 2015

Dear Ms. Dortch:

I am writing to oppose the FCC application for experimental license to deploy Space X for global communication. I understand there are eight proposals to place extensive satellite networks in space that would require the launch of hundreds of kerosene-burning rockets annually. Space X plans to launch 4,000 low-orbit satellites over the next five years to facilitate global WiFi, using pulsed microwave radiation from space.

This satellite program raises three serious public health and environmental concerns: 1) Destruction of the ozone layer; 2) Acceleration of uncontrolled global climate change; and 3) Adverse environmental and health impacts of wireless microwave radiation on all humans, insects, birds and other animals in the range of the system. This is not to mention the inadequate assessment of the real need and purpose of such a proposal.

When looked at scientifically, this misguided proposal creates an apocalyptic scenario. Much more time and unbiased scientific inquiry into the global adverse impacts is needed before considering this project. A transparent process with input from both independent scientists as well as the public is crucial. Both long and short term effects need to be taken into account. This will not happen with an expedited process.

A full open public hearing is needed to consider the advantages and disadvantages of this proposal.

We have learned too many lessons late where public and global health have suffered. Industry rushes in without adequate safety testing, especially for long term impacts. Only the immediate benefits are taken into account. Asbestos, CFCs, Bisphenol A, DDT, lead and mercury all had early warnings from scientists, but it took many years and sometimes decades before a course change occurred, if at all. We are now experiencing the fallout of the internal combustion engine, the gas and oil industry and their long term impacts on our health, as well as climate change. There are many more historic and current examples of our failed regulatory system, which has not taken enough time or broad enough safety measures to prevent inevitable harm by dismissing scientists' concerns and allowing industry to make the decisions. This is especially problematic with the newer

partnerships of government and industry, which can be very beneficial, but also can blur the lines of bias.

1) OZONE

Regarding the ozone layer, we are already on a dangerous path from the continued affects of older CFCs still present in the atmosphere, as well as newer, complex compounds used in plasma TVs and other electronic devices that have been shown to damage the ozone layer. Some chemicals that scientists have found to affect the ozone layer cannot be identified as primary products, but byproducts of unknown chemical reactions. Although some chemicals may be found in smaller amounts, they may have a much more powerful ability to deplete ozone, are additive, and may last for centuries in the atmosphere. This highlights the unpredictability of our well intentioned actions.

In his 2009 article, Ross states, "As the space industry grows and ODSs fade from the stratosphere, ozone depletion from rockets could become significant. This raises the possibility of regulation of space launch systems in the name of ozone protection." He goes on to state that rockets could
"become a significant contributor to the problem of stratospheric ozone depletion. This follows from three unique characteristics of rocket emissions:

a) Rocket combustion products are the only human-produced source of ozone-destroying compounds injected directly into the middle and upper stratosphere. The stratosphere is relatively isolated from the troposphere, so emissions from individual launches accumulate in the stratosphere. [8] Ozone loss caused by rockets should be considered as the cumulative impact of several years of all launches from all space organizations across the planet.

b) Stratospheric ozone levels are controlled by catalytic chemical reactions driven by only trace amounts of reactive gases and particles. [9] Stratospheric concentrations of these reactive compounds are typically about one-thousandth of that of ozone. Deposition of relatively small absolute amounts of these reactive compounds can significantly modify ozone levels.

d) Rocket engines are known to emit many of the reactive gases and particles that drive ozone destroying catalytic reactions. [10] This is true for all propellant types. Even water vapor emissions, widely considered inert, contribute to ozone depletion."

In addition, a newly discovered greenhouse gas, perfluorotributylamine, is 7,000 times more powerful than CO2. It is an unregulated, persistent industrial chemical that has eclipsed all other chemicals in its global climate change potential. The chemical is used in electronics, but it is unknown how much of this comes from the space industry or how it interacts with other greenhouse gases created by the space industry.

2) GLOBAL CLIMATE CHANGE

The thousands of proposed satellite networks would require the launch of hundreds of kerosene-burning rockets annually. A 2011 study by the Aerospace Corporation demonstrated that the black carbon particles emitted directly into the atmosphere 12 miles above the Earth could absorb heat and trap heat as well. Some rockets have 1,000 times more soot than regular aircraft. The soot will not dissipate, but rather will accumulate in the atmosphere. Atmospheric science is complicated and humans have manipulated it to the degree that we now urgently need to reduce output of CO2, methane and other greenhouse gases globally in order to stabilize the Earth's climate.

We need to better understand the complex system of emissions and impacts of climate variability before proceeding. Space transportation is not necessary for survival of humans and the Earth, but it could very likely provide our accelerated demise if we are not more deliberate in our decisions and take into account a sustainability factor in all endeavors.

3) PUBLIC HEALTH AND ENVIRONMENTAL IMPACTS OF WIRELESS MICROWAVE RADIATION

There are thousands of studies over the last several decades, and more recent research, that has clearly demonstrated that wireless microwave radiation from cell phones, cell towers, WiFi routers and smart meters is not inert and can have adverse biological impacts on living organisms, including humans, plants, birds, insects, reptiles and other animals. This includes DNA damage, reproductive harm, abnormal stress proteins and neurological harm. It is estimated that 3% of the population is sensitive to microwave radiation and cannot be in the presence of cell phones or cell towers. It is predicted that with increasing wireless radiation, more and more of the population will become sensitive. This is due to the cumulative impacts of oxidation on cell membranes and structures. At least one cellular mechanism of action has been found to explain the far reaching effects on cell membranes and biological systems.

In 2011 the World Health Organization classified wireless radiation emitted by cell phones and other wireless commercial infrastructure as a Class 2B possible human carcinogen.

On February 7, 2014 the U.S. Department of Interior stated in a letter to the National Telecommunications and Information Administration that "The second significant issue associated with communication towers involves impacts from non- ionizing electromagnetic radiation emitted by these structures. Radiation studies at cellular communication towers were begun circa 2000 in Europe and continue today on wild nesting birds. Study results have documented nest and site abandonment, plumage deterioration, locomotion problems, reduced survivorship, and death *(e.g.,* Balmori 2005, Balmori and Hallberg 2007, and Everaert and Bauwens 2007). Nesting migratory birds and their offspring have apparently been affected by the radiation from cellular phone towers in the 900 and 1800 MHz frequency ranges -- 915 MHz is the standard cellular phone frequency used in the United States. However, the electromagnetic radiation

standards used by the Federal Communications Commission (FCC) continue to be based on thermal heating, a criterion now nearly 30 years out of date and inapplicable today."

It seems irrational to approve technology applications that encourage global proliferation of RF microwave radiation when the EMF standards are out-dated.

The involuntary exposure of continuous microwave radiation from this experimental program could well violate the Nuremberg Code on human experimentation adopted by the United States, which requires well-informed consent and that experiments should not be conducted if there is any reason to suspect disability, mental health or physical suffering, and that human subjects must be free to discontinue the experiment at any point they feel mentally or physically harmed. This system could not be easily shut off once deployed. Global WiFi projects would blanket humans, birds and all wildlife with wireless EMF and make exposure inescapable.

INSURANCE /ECONOMIC CONCERNS

There are also insurance and economic concerns with such a space launch project. In a 2013, Emerging Risk Report, Zurich based Swiss Re, the second-largest reinsurer in the world and the insurer of the World Trade Center, listed electromagnetic fields in the highest category of casualty risk due to "unforeseen consequences" beyond 10 years. This implies scores of claims and significant future product liability losses.

Approval of this application is premature and an injustice to democracy and to humanity. Lengthy, full public testimony, disclosure and discussion about alternatives is needed first. There is much to learn about the health and environmental impacts of continuous microwave radiation exposure, in addition to the obvious need for setting new standards that consider all the studies performed by the military and scientific community. As a physician, wife and parent, I ask that you please consider the real necessity of rapid deployment of this project along with its consequences to future generations-including your own. While this project has taken on a Star Wars fascination, it will be in all of our best interests to give ourselves a reality check and take a cautionary approach.

Please deny this application for Space X and call for a full public hearing on this matter.

Respectfully submitted,
Cindy Russell, MD

Newly detected ozone-depleting substances in the atmosphere. Nature Geoscience. Feb 2014.http://www.nature.com/ngeo/journal/v7/n4/full/ngeo2109.html

Perfluorotributylamine: A novel long-lived greenhouse gas. Geophysical Research Letters. Nov 2013.http://onlinelibrary.wiley.com/doi/10.1002/2013GL058010/abstract

Limits on the Space Launch Market Related to Stratospheric Ozone Depletion. The International Journal of Space Politics and Policy. 2009. Martin Ross. http://www.tandfonline.com/doi/full/10.1080/14777620902768867

Rocket Soot Emissions and Climate Change http://www.aerospace.org/crosslinkmag/summer2011/rocket-soot-emissions-and-climate-change/

Letter from The Department of Interior to National Telecommunications and Information Administration https://www.ntia.doc.gov/files/ntia/us_doi_comments.pdf

Swiss Re Sonar: Emerging Risk Insights **http://www.stopumts.nl/pdf/Zwitserland%20Swiss%20Reinsuranse%202013.pdf**