

# Global Union Against Radiation Deployment from Space

[www.stopglobalwifi.org](http://www.stopglobalwifi.org)



July 29, 2015

**E-Filed**

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**

Dear Ms. Dortch,

As reported in the *New York Times* (June 15, 2015), Elon Musk's spacecraft and rocket manufacturing company, SpaceX, has begun the application process to launch 4,000 low-orbit satellites over the next five years to facilitate global WiFi, using pulsed microwave radiation from space. This raises many public health and environmental issues discussed below. Question 9 of the SpaceX FCC application asks if there will be an Environmental Impact from the project and the applicant has answered in the negative. We emphatically disagree.

GUARDS is an international coalition against global WiFi from space, a complex technology of radiation and toxic chemicals endangering all life on Earth. We are concerned pollution arising from these many rocket launchings will negatively impact and possibly even destroy the ozone layer, thereby significantly contributing to rapid adverse climate change. The insurance industry currently recognizes the immense risks of insuring companies against radiofrequency injury claims and coverage from the major firms like Lloyds and Swiss Re is no longer available. With the lack of adequate insurance, and radiofrequency radiation (RFR) currently classified a "possible human carcinogen" by the World Health Organization, there are legal implications related to irradiating entire countries, and citizens, across the planet without their informed consent. Strong correlations exist between RFR exposure from wireless technologies, increasing rates of Electrohypersensitivity (EHS) and some cancers. In several countries plaintiffs have gone beyond correlation to successfully prove causation and damages have been awarded by the courts. It is also important to highlight the potential that satellites and or their communications could be hijacked, posing serious security risks.

Furthermore, this proposal violates Section 7 of the 51 U.S. Code Chapter 509 - COMMERCIAL SPACE LAUNCH, the **United Nations** Rio Convention, the UN Convention on the Rights of Persons with Disabilities, several sections of the UN Convention on the Rights of the Child, and International Human Rights Law. Seeing that increasing numbers of countries, such as Switzerland and Australia, recognize Electrohypersensitivity (EHS) as a medical disability, global WiFi would contravene Article 3 of being afforded "equal access to public service in one's country," since the planet would be blanketed with microwave radiation (MWR) that those with EHS could not escape. This proposal also triggers the need for

an MOU with USFWS under Executive Order 13186 concerning effects on migratory birds. Legal issues and liability aside, the cumulative and additive atmospheric, environmental and health risks of MWR saturation from space are extremely high. Approval of such technology may never be appropriate given the high risks to societies but certainly at present, given the current state of our knowledge, permit approval would be premature.

## **Destruction of Ozone Layer and Impact on Climate – An Environmental Catastrophe**

Rocket exhaust contains ozone-destroying chlorine, water vapor (a greenhouse gas), and aluminum oxide particles, which seed stratospheric clouds. Complete ozone destruction is observed in the exhaust plumes of rockets. The *New York Times* (May 14, 1991, p. 4) quoted Aleksandr Dunayev of the Russian Space Agency saying, “About 300 launches of the space shuttle each year would be a catastrophe and the ozone layer would be completely destroyed.”

In 1991, the world averaged only 12 rocket launches per year. Maintaining a fleet of (ultimately) 4,000 satellites, each with an expected lifespan of five years, will likely involve enough yearly rocket launches to be an environmental catastrophe.

The full text of a 2009 article by Martin N. Ross of the Aerospace Corporation and others, titled “Limits on the Space Launch Market Related to Stratospheric Ozone Depletion,” is here: <http://www.tandfonline.com/doi/full/10.1080/14777620902768867#abstract>

This article updates the science and expresses the concern a significant increase in rocket launches could have a devastating impact on the ozone layer.

Increased Black Carbon from rocket soot emissions may also play a major role in atmospheric ozone and temperature changes. A 2010 article by Ross, et al., concerned with carbon soot from rockets, is here: <http://onlinelibrary.wiley.com/doi/10.1029/2010GL044548/epdf>

The authors conclude a dramatic increase in rocket launches could significantly impact climate. This is because rockets are prolific emitters of carbon soot, such soot remains in the stratosphere for years, and black soot absorbs heat. Ross states that an increase in the number of launches by a factor of ten or more would be of extreme concern. He mentions space exploration, space tourism, solar power, and other reasons for an expected increase in launches. At the time he wrote, the prospect of launching 800 satellites per year for global WiFi had not yet been conceived.

A 2013 article, titled “Impact of Rocket Exhaust Plumes on Atmospheric Composition and Climate – An Overview,” by scientists at the Institute for Atmospheric Physics in Germany, echoes earlier concerns even more strongly. <http://www.eucass-proceedings.eu/articles/eucass/pdf/2013/01/eucass4p657.pdf>

SpaceX’s proposed 4,000 satellites have an expected lifespan of 5 years, so to maintain such a fleet would require at least 800 satellites to be launched per year. The FCC ought not approve such a scheme without analyzing the expected effects on climate and the ozone layer.

## **RF Radiation - Environmentally Harmful and a Public Health Hazard**

### **DOI States Current Radiation Standards Inapplicable**

On February 7, 2014, the U.S. Department of Interior stated that **"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,"** in reference to the current limits governing radiation utilized by WiFi. The DOI letter discusses a number of studies in which birds appear

harmed by low-level radiofrequency radiation associated with cell towers and other wireless technologies, as are planned by SpaceX. [http://www.ntia.doc.gov/files/ntia/us\\_doi\\_comments.pdf](http://www.ntia.doc.gov/files/ntia/us_doi_comments.pdf)

## FCC Investigation of Current Exposure Limits Underway

With the FCC finally beginning reevaluation of current irrelevant and obsolete non-ionizing RF exposure guidelines, it seems hardly prudent to approve technology applications encouraging global proliferation of RF microwave radiation. "In the *Inquiry* the FCC requests comment to determine whether its RF exposure limits and policies need to be reassessed. Since consideration of the limits themselves is explicitly outside of the scope of ET Docket No. 03-137, the FCC opens a new docket, ET Docket No. 13-84, with the *Inquiry* to consider these limits in light of more recent developments. The *Inquiry* is intended to open discussion on both the currency of our RF exposure limits and possible policy approaches regarding RF exposure." <https://www.fcc.gov/encyclopedia/radio-frequency-safety>

## World Health Organization (WHO) Scientists Warn of Increased Risk to Public Health

We are also concerned spatial and temporal increases in microwave radiation caused by this and other planned airborne WiFi deployments will be harmful to public health. WiFi operates using pulsed microwave radiation: "The human body says Dr GJ Hyland, (International Institute of Biophysics\* Neuss-Holzheim, Germany) is an electrochemical instrument of exquisite sensitivity" noting that, like a radio, it can be interfered with by incoming radiation." If a signal is strong enough to operate a device, it is strong enough to disturb every cell in the human body.

In 2011, the International Agency for Research on Cancer (IARC), a committee of the WHO, classified RF radiation as a Group 2B carcinogen in the same category as lead and DDT. Alarming, several scientists that were members of the IARC working group involved with this classification now conclude the risks are much greater than originally thought. For example, Dr. Dariusz Leszczynski warns that RF-EMF should be classified as a Group 2A carcinogen, and Dr. Lennart Hardell reports that several studies indicate a Group 1 classification is justified, placing RF-EMF in the same category as tobacco, asbestos, and benzene. Dr. Lennart Hardell MD, PhD <http://www.ncbi.nlm.nih.gov/pubmed/24192496>

Based on the Hill criteria, glioma and acoustic neuroma should be considered to be caused by RF-EMF emissions from wireless phones and regarded as carcinogenic to humans, **classifying it as group 1** according to the IARC classification. **Current guidelines for exposure need to be urgently revised** (emphasis added).

Dr. Dariusz Leszczynski MSc, DSc, PhD

<https://betweenrockandhardplace.wordpress.com/2014/08/14/carcinogenicity-of-cell-phone-radiation-2b-or-not-2b/>

In conclusion, I consider that currently the scientific evidence is sufficient to classify cell phone radiation as a probable human carcinogen – **2A category in IARC scale**. Time will show whether 'the probable' will change into 'the certain'. However, it will take tens of years before issue is really resolved. In the meantime **we should implement the Precautionary Principle. There is a serious reason for doing so** (emphasis added).

The World Health Organization also admits current RF exposure guidelines do not protect the public.

Guidelines are set for the average population and **cannot directly address the requirements of a minority of potentially more sensitive people** (emphasis added). Air pollution guidelines, for example, are not based on the special needs of asthmatics. Similarly, electromagnetic field guidelines are not designed to protect people from interference with implanted medical electronic devices such

as heart pacemakers. Instead, advice about exposure situations to be avoided should be sought from the manufacturers and from the clinician implanting the device.

<http://www.who.int/peh-emf/about/WhatIsEMF/en/index4.html>

## **International Scientists Warn of High Risk and Multigenerational Effects**

The 1500-page BioInitiative Report on RF/MW health effects was published in 2012. The authors are 29 scientists from ten countries. They reviewed thousands of studies showing interference with chemical processes in the body, implicating RF/MW in a whole spectrum of alarming effects including genetic damage, cancer, immune dysfunction, neurological injury, and infertility. [www.bioinitiative.org](http://www.bioinitiative.org)

Just recently over 200 scientists from 40 countries with over 2,000 peer-reviewed journal articles to their collective credit in the field of biological impacts from RF/EMF, appealed to the UN and WHO for greater precautions with regard to exposures from wireless technologies. This is the latest in many such alerts to the health effects of RF/EMF exposure. <https://www.emfscientist.org/>

## **International Liability**

Countries around the world are increasingly recognizing the risks of RF radiation and advising action to protect the public [http://www.cellphonetaskforce.org/?page\\_id=128](http://www.cellphonetaskforce.org/?page_id=128). Even the US as cited above is in the process of reviewing RF exposure guidelines. Countries such as China, Russia, Italy and Switzerland already have wireless radiation safety limits 100 times safer than the United States.

In June 2015, Canadian Parliament's Standing Committee on Health (HESA) issued a report with 12 recommendations for increased caution, investigations, reporting and data gathering with regard to RF/EMF and wireless devices. "The [HESA] Committee agrees that the potential risks of exposure to RF fields are a serious public health issue that needs to be brought to the attention of Canadians so that they have the knowledge to use wireless devices responsibly and are able to make decisions about the use of wireless devices in a manner that protects their health and the health of their families."

[http://www.parl.gc.ca/Content/HOC/Committee/412/HESA/Reports/RP8041315/412\\_HESA\\_Rpt13\\_PDF/412\\_HESA\\_Rpt13-e.pdf](http://www.parl.gc.ca/Content/HOC/Committee/412/HESA/Reports/RP8041315/412_HESA_Rpt13_PDF/412_HESA_Rpt13-e.pdf)

Canada's Safety Code 6 providing guidelines for RF exposure were virtually identical to 1996 FCC guidelines until recently (March, 2015) when Canada reduced its maximum permissible WiFi RF exposure limits by nearly 50%.

The European Economic and Social Committee (EESC) is an EU advisory body comprising representatives of workers' and employers' organizations and other interest groups. It issues opinions on EU issues to the European Commission, the Council of the EU and the European Parliament, thus acting as a bridge between the EU's decision-making institutions and EU citizens. Its three key tasks are to:

- ensure that EU policy and law are geared to economic and social conditions, by seeking a consensus that serves the common good
- promote a participatory EU by giving workers' and employers' organizations and other interest groups a voice and securing dialogue with them
- promote the values of European integration, and advance the cause of participatory democracy and civil society organizations.

In February 2015, a formal letter of notice was sent to the European Economic Social Committee by the UK Radiation Research Trust and approximately 90 other organizations from around the world in support of millions of people, estimated to be between 22,000,000 and 37,000,000 throughout Europe, currently suf-

fering with electromagnetic hypersensitivity due to exposure to the proliferation of mobile phones, DECT cordless phones, cordless baby monitors, phone masts, WiFi, smart meters and the smart grid.

These are but three indications of the potential global liability and political implications that space-based WiFi technology could affect. [http://www.radiationresearch.org/images/rrt\\_articles/EM-Radiation-Research-Trust-Letter-of-Notice-Served-on-Mr-Richard-Adams.pdf](http://www.radiationresearch.org/images/rrt_articles/EM-Radiation-Research-Trust-Letter-of-Notice-Served-on-Mr-Richard-Adams.pdf)

Canadians for Safe Technology (C4ST) point out that some “researchers estimate approximately 3% of the population has moderate symptoms such as impaired immune system and chronic illness (Havas, 2007.) Hallberg and Oberfeld, published in *Electromagnetic Biology and Medicine*, (2006,) show historical EHS data and project if past trends continue that 50% of the total population is expected to be Electrosensitive by year 2017. [http://www.next-up.org/pdf/EHS2006\\_HallbergOberfeld.pdf](http://www.next-up.org/pdf/EHS2006_HallbergOberfeld.pdf)

C4ST elaborate that “EHS is accepted as a functional impairment in Sweden and the Canadian Human Rights Commission recognizes it as an environmental sensitivity and classifies it as a disability.” With some countries already recognizing the medical needs of those affected by EHS, the potential for millions of people around the world to become EHS from increased WiFi proliferation is unacceptable.

## **Environmental Impacts**

A parade of studies continue to be published implicating wireless technology in the die-off of forests, the demise of frogs, bats, and honey bees, the threatened extinction of the house sparrow, and damage to the DNA of the human species. It is vital to the continuation of life that large parts of Earth are spared the incessant radiation that accompanies wireless technologies.

- "The Report on Possible Impacts of Communication Towers on Wildlife Including Birds and Bees" commissioned on 30th August 2010 by the Ministry of Environment and Forest, Government of India [http://www.moef.nic.in/downloads/public-information/final\\_mobile\\_towers\\_report.pdf](http://www.moef.nic.in/downloads/public-information/final_mobile_towers_report.pdf)
- "Impacts of radio-frequency electromagnetic field (RF-EMF) from cell phone towers and wireless devices on biosystem and ecosystem – a view," [http://www.biolmedonline.com/Articles/Vol4\\_4\\_2012/Vol4\\_4\\_202-216\\_BM-8.pdf](http://www.biolmedonline.com/Articles/Vol4_4_2012/Vol4_4_202-216_BM-8.pdf)
- Balmori, A. “Electromagnetic pollution from phone masts. Effects on wildlife,” *Pathophysiology* (2009), doi:10.1016/j.pathophys.2009.01.007 <http://www.ncbi.nlm.nih.gov/pubmed/19264463>
- An October 31, 2014, presentation to the Manitoba Entomological Society, reviewing 91 studies on the effects of RF/MW radiation on honey bees, insects, birds, etc: [https://groups.google.com/forum/#!topic/mobilfunk\\_newsletter/0RUPGTI4qQY](https://groups.google.com/forum/#!topic/mobilfunk_newsletter/0RUPGTI4qQY)

## **United Nations Rio Declaration on Environment and Development**

The Precautionary Principle as drawn up in Rio in 1992 - the Rio Declaration: <http://www.gdrc.org/u-gov/precaution-7.html>

In order to protect the environment, the precautionary approach shall be widely applied by States according to their capabilities. Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation.

Principle 15 codified for the first time at the global level the precautionary approach, which indicates that lack of scientific certainty is no reason to postpone action to avoid potentially serious or irreversible harm to the environment. Central to principle 15 is the element of anticipation, reflecting a requirement that effective environmental measures need to be based upon actions which take a long-term approach and which might anticipate changes on the basis of scientific knowledge.

## **From the UN General Assembly: Resolution adopted by the General Assembly July 2012**

### **66/288 The Future We Want**

275. We recognize the importance of strengthening international, regional and national capacities in research and technology assessment, **especially in view of the rapid development and possible deployment of new technologies that may also have unintended negative impacts, in particular on biodiversity and health, or other unforeseen consequences** (emphasis added.)

[http://www.un.org/ga/search/view\\_doc.asp?symbol=A/RES/66/288&Lang=E](http://www.un.org/ga/search/view_doc.asp?symbol=A/RES/66/288&Lang=E)

An ETC Group Press Release “UN moves towards an early listening system,” shares: “The decision paves the way for a badly needed early warning system on the impacts of new technologies” and explains:

ETC Group proposed the creation of a technology assessment capacity in the UN in the lead up to the 2012 Rio Summit. At that time, the proposal was backed by the G-77 and China and a few OECD states such as Sweden and Norway. **The Summit concluded with a surprisingly strong call for technology assessment from local to global levels warning that new technologies could pose significant health and environmental risks** (emphasis added.)<sup>[i]</sup>

<http://www.etcgroup.org/content/un-moves-towards-technology-early-listening-system>

And from the Lancet:

Planetary health is a new science that is only beginning to draw the coordinates of its interests and concerns. It demands new coalitions and partnerships across many different disciplines to meet the pervasive knowledge failures identified by this Commission. It demands new attention to governance and implementation. And, perhaps most of all, it demands **more creative imagination among scientists and practitioners working in health—redefining the meaning of human progress, rethinking the possibilities for human cooperation, and revitalising the prospects for the health of human civilizations** (emphasis added.) (par 7)

and

Second, planetary health concerns the natural systems within which our species exists—for example, **the health and diversity of the biosphere. Human beings live within a safe operating space of planetary existence. If the boundaries of that space are breached, the conditions for our survival will be diminished** (emphasis added.)" Currently, natural systems are being degraded to an extent unprecedented in history, with known and as yet unknown and unquantified effects on human health. (par 2)

[http://www.thelancet.com/pdfs/journals/lancet/PIIS0140-6736\(15\)61038-8.pdf](http://www.thelancet.com/pdfs/journals/lancet/PIIS0140-6736(15)61038-8.pdf)

## **51 U.S. Code Chapter 509 - COMMERCIAL SPACE LAUNCH**

Section 7 of the following excerpt from the Legal Information Institute: (7) the United States should encourage private sector launches, reentries, and associated services and, only to the extent necessary, regulate those launches, reentries, and services to *ensure compliance with international obligations of the*

*United States and to protect the public health and safety, safety of property, and national security and foreign policy interests of the United States* (emphasis added);  
<https://www.law.cornell.edu/uscode/text/51/50901>

## **Insurance Companies Warn of Large Losses from Electromagnetic Fields**

We also note that insurance in the event of injury due to RF/MWR radiation is not likely to be adequate – see pages 1 and 2 in the document at the following link:

<http://www.gao.gov/assets/600/591391.pdf>

A recent blog shares: “Insurance firm, Swiss Re, warns of large losses from “unforeseen consequences” of wireless technologies: <http://emfrefugee.blogspot.ca/2014/04/major-insurance-firm-swiss-re-warns-of.html> (Source: swissre.com)

Specialists from the Emerging Risks team at leading global reinsurance firm, Swiss Re, are warning the insurance industry that “unforeseen consequences of electromagnetic fields” could lead to a raft of claims and significant product liability losses in the next 10 years.

In its Swiss Re SONAR Emerging Risks report, 2013, which covers risks that could “impact the insurance industry in the future”, the company categorizes the impact of health claims related to electromagnetic fields (EMFs) as ‘high’. It acknowledges recent reports of courts’ ruling in favor of claimants who have experienced health damage from mobile phones, and also says that anxiety over risks related to EMFs is “on the rise”.

The document states that whilst the majority of the topics covered in its pages were of “medium impact”, health issues associated with EMFs sit in the highest impact category. Other topics discussed include the dangers of cyber attacks, power blackouts, workplace safety and Big Data all of which are exacerbated and/or added to with the ill-conceived “smart” metering programs.

Lloyds listed hazards from new technologies including EMF in its 2011 Top 50 Risks. Coverage for RF/EMF injuries typically related to cell phones and cell towers is now categorically excluded. In their 2013 Risk Report new technology risks have increased slightly in risk rank. It is worth noting these risks are classified under Environmental (i.e. does the applicant expect to have an adverse environmental impact?) as distinct from the Lloyds appraisal of cybersecurity risks (also applicable to SpaceX and rated much higher risk).

<http://www.lloyds.com/~media/Files/News%20and%20Insight/Risk%20Insight/Risk%20Index%202013/Report/Lloyds%20Risk%20Index%202013report100713.pdf>

GUARDS asserts the global WiFi proposal would intensify these concerns on a global scale.

## **NEPA and Environmental Review**

This is major Federal action significantly affecting the quality of human environment, as such a NEPA review would be triggered. The potential environment and human health hazards from SpaceX’s and similar space-based WiFi projects underscore the need for comprehensive review. This is a situation that calls for NEPA review *Envtl. Def. Fund v. Tenn. Valley Auth.*, 468 F.2d 1164, 1174 (6th Cir. 1972), and, specifically, a formal Environmental Impact Statement (EIS). The EIS should include a full review of climate and environmental effects, as well as human health and safety. The FCC has an obligation to evaluate whether

“services or capabilities are essential to public health, safety, or in the public interest” (H.R. Report No. 104-204, p. 94) so must protect the public from possible harm caused by radiofrequency radiation.

The FCC is not entitled to essentially disregard our comments because they do not provide global cost-benefit analysis (*Scenic Hudson v. Federal Power Commission*). The Commission has an affirmative duty to inquire into and consider all relevant facts. They must use government resources to perform the relevant analysis. The FCC should request the EPA use its National Risk Management Research Laboratory resources and experts to conduct all cost analyses necessary.

## Conclusion

Direct health care costs, production costs from missed or substandard work performance, lost or compromised ecological services and direct agricultural related costs related to RF/EMF exposure could cost societies billions of dollars. Not only is RF/EMF proliferation bad for health and the environment directly, this damage has a major economic cost as well.

With the very real threat to our ozone layer, implications for accelerated climate change, the insurance industry recognizing the serious potential for risk from cyber and grid security and health aspects of this technology, radiofrequency radiation currently classified “possible human carcinogen” by the World Health Organization, legal implications related to irradiating entire countries across the planet without informed consent, personal security risks, and resulting UN conventions that would be violated, please consider our comments as reasons a permit for the proposed project should be denied. Because the potential global effects of this and similar proposals from Facebook, Google and others are devastating, any consideration must proceed only with maximum levels of due diligence including full public access to application documents and all project specifications.

Sincerely,



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