Before the
Federal Communications Commission
Washington, D.C. 20554

In the Matter of	**)**	
	)	
Fostering Innovation and Investment in the Wireless Communications Market	**)**	**GN Docket No. 09-157**
	)	
	)	
A National Broadband Plan for Our Future		**GN Docket No. 09-51**

To the Commission:

Comments from Nickolaus E. Leggett
Inventor and Licensed Radio Operator

I am one of the original petitioners for the establishment of the Low Power FM (LPFM) radio broadcasting service (RM-9208 July 7, 1997 subsequently included in MM Docket 99-25). I am also a certified electronics technician (ISCET and iNARTE) and an Extra Class amateur radio operator (call sign N3NL). I hold an FCC General Radiotelephone Operator License with a Ship Radar Endorsement. I am an inventor holding three U.S. Patents. My latest patent is a wireless bus for digital devices and computers (U.S. Patent # 6,771,935). I have a Master of Arts degree in Political Science from the Johns Hopkins University. I am also one of the petitioners in the docket to establish a low power radio service on the AM broadcast band (RM-11287).

My comments are focused on several specific questions from the Commission in this Notice of Inquiry. My comments are written from my experience as an inventor, innovator, and analyst of technological consequences.

An Alternative to Wireless Towers

In Paragraph 53 (Page 18) of the NOI, the Commission requests "We also seek

comment on whether there are ways to alter the role of tower siting in the design and deployment of network resources". A promising alternative to wireless network towers is the use of long-duration unmanned aircraft circulating at high altitudes in the atmosphere.

These unmanned aircraft would be equipped with network relays that could serve large geographic areas. Each aircraft would be powered by solar cells and rechargeable batteries or by power broadcast up to the aircraft by microwave beams illuminating a rectifying antenna (rectenna). Each of these high-altitude unmanned aircraft could replace hundreds of conventional wireless antennas.

These aircraft would cruise above storms and bad weather. They would serve large areas and they would remove the need for numerous antenna towers that many citizens consider to be ugly. In addition, they would be resistant to sabotage or terrorist attacks.

I am requesting that the Commission consider this alternative technology and that the Commission consult with the National Aeronautics and Space Administration (NASA) and the aerospace industry about the current and future status of this technology. Based on this consultation, the Commission should open a Notice of Inquiry (NOI) or a Notice of Proposed Rulemaking (NPRM) specifically addressing regulations and rules that would assist the constructive application of unmanned aircraft as an alternative to wireless antenna towers.

Supporting Innovation and Experimentation

In Paragraph 65 (Page 22) of the NOI, the Commission asks "…what can be done to affirmatively support experimentation in wireless technology and services"? The Commission should consult with the American Radio Relay League (ARRL) to make

sure that the Amateur Radio Service (ARS) rules do not block any wireless experimentation by amateur radio operators such as me. My interpretation of the amateur radio rules is that they clearly permit and encourage experimentation with various types of novel wireless technologies. Amateur radio is an excellent environment for experimenting, innovating, and inventing because it allows the licensed operator to design and build his own wireless equipment. Amateur radio assisted me in formulating my own wireless bus invention (U.S. Patent # 6,771,935).

In addition, the Commission should establish rules where individuals can experiment with new wireless technologies for providing neighborhood network service. Within a broad framework of regulation, individuals should be allowed to design and build their own wireless equipment for operation in the currently available license-free portions of the microwave spectrum. For many types of experimentation, the freedom to design and build your own hardware and software is needed. If this license-free band experimentation was limited to FCC Certified (Type Approved) modules, the results of the experimentation would be much more limited.

Also, research organizations and universities should be allowed to operate experimental stations without individual coordination of frequencies (Paragraph 66 on Page 23 of the NOI). University students and professors have a lot to offer if they are granted the freedom to create new network technologies and structures. In many ways a campus is an ideal environment for an experimental network. Furthermore, most campuses are small enough so that light waves or millimeter waves can easily be used for the transmission of network traffic. Innovative communications protocols, such as my Lighthouse Protocol, can be used for mobile and fixed communications. (Refer to the

references at the end of this document.)

The Millimeter Waves for Wireless Networks

All of these wireless experimenters should be encouraged to operate in the millimeter waves where there is huge capacity for communications. These frequencies allow an almost unlimited bandwidth for numerous users. In addition, some of the millimeter wave frequencies (in the vicinity of 60 GHz) have a high degree of atmospheric absorption of the radio signals which establishes natural coverage cells for extensive frequency reuse.

Unlock the Inventive Power of Individuals and Private Enterprise

The Commission needs to take positive steps to make sure that individuals and small enterprises have the freedom to design, build, and operate their own experimental innovative wireless hardware, software, and networks. The more technological freedom that is provided, the more significant new inventions will be generated.

Respectfully submitted,

Nickolaus E. Leggett
N3NL Amateur Radio Extra Class Operator
1432 Northgate Square, #2A
Reston, VA 20190-3748
(703) 709-0752

September 4, 2009

References:

Patents granted to Nickolaus E. Leggett:
United States Patent 6,771,935, Wireless Bus August 3, 2004
United States Patent 3,280,929 Ground-Effect Machine October 25, 1966
United States Patent 3,280,930 Ground-Effect Vehicle October 25, 1966

"Demonstration and Development of Amateur Radio Applications of Natural Vacuum Electronics"; Nickolaus E. Leggett, N3NL - 22nd AMSAT Space Symposium and Annual Meeting October 8-10, 2004 in Arlington, Virginia

"A 'Lighthouse' Protocol for Random Microwave Contacts", Nickolaus E. Leggett, N3NL, QEX The Experimenter's Exchange – Technical Notes July/August 2004 – American Radio Relay League (ARRL), Newington, CT

Over 200 formal comments in Federal Government rulemaking proceedings. These are accessible through the Regulations.gov website and the FCC's Electronic Comment Filing System (ECFS) at www.fcc.gov