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

In the Matter of	**)**	
	)	
Promoting Expanded Opportunities for	**)**	**ET Docket No. 10-236**
Radio Experimentation and Market Trials	**)**	
under Part 5 of the Commission's Rules	**)**	
and Streamlining Other Related Rules	**)**	
	)	
2006 Biennial Review of	**)**	**ET Docket No. 06-155**
Telecommunications Regulations – Part 2	**)**	
Administered by the Office of Engineering	**)**	
and Technology (OET)	**)**	
	)	

To the Commission:

Reply Comments from Nickolaus E. Leggett,
Inventor, Analyst, 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 invented this invention based on my experience in amateur radio. Refer to Appendix A for details of this invention.

I have a Master of Arts degree in Political Science from the Johns Hopkins University (May 1970).

Reply Comment

The following is a reply comment supporting the high value of astronomy and the

need for innovation zones to accommodate professional and amateur astronomy. This reply comment is in reply to the filed comments of Dr. Harvey S. Liszt, Spectrum Manager at the National Radio Astronomy Observatory.

The Value of Astronomy

The science of astronomy has a very high value. This is because of the following aspects of astronomy:

- Astronomy describes the known universe and the context of the Earth within that universe.
- Astronomy provides an observational environment for physics and physical events that cannot be duplicated on the Earth.
- Astronomy predicts the future physical development of the solar system and the Earth itself.
- On a more speculative aspect, there may be artificial radio transmissions from extraterrestrial civilizations. This is the scientific search for extra terrestrial intelligence (SETI). If such transmissions are rich in data, they would be of immense economic value.
- Astronomy supports robotic and human space flight which can be highly useful for scientific and industrial purposes.

The above aspects of astronomy indicate that astronomy is actually more valuable than all of the likely inventions and innovations from any of the proposed innovation zones. For this reason, existing and formally planned astronomy activity should be given priority over the establishment of an innovation zone in any given remote region. For

example, the operation of the National Radio Astronomy Observatory in West Virginia should automatically block the establishment of an innovation zone anywhere near to the observatory.

The Vulnerability of Radio Astronomy

Radio astronomy observations are quite vulnerable to interference for several major reasons:

- The radio waves from celestial sources are usually quite weak.
- The radio waves are broadband in nature and the radio astronomy receivers must be broadband.
- Many radio astronomy observations are made in lightly-utilized frequencies assigned to other radio services. This is necessary because the celestial phenomena are on more frequencies than the frequencies formally assigned to radio astronomy.
- Radio astronomy operation is passive in nature, and so there is no indication or warning to other users that interference with radio astronomy is occurring.

For these reasons, radio astronomy needs special consideration when innovation zones are established by the Commission.

Amateur Radio Astronomy

In addition, there is a significant amount of amateur radio astronomy activity. Some of this activity is near 20 MHz using radio receiving equipment supplied by the NASA-supported Radio JOVE project for schools and radio experimenters. Refer to Note 1. Other amateur radio astronomers operate microwave receivers near the hydrogen

line emissions from space. Refer to Note 2. These amateurs have quite sophisticated observing equipment using parabolic antennas and low-noise amplifiers. Still other amateur radio astronomers operate on different frequencies. Also, licensed amateur radio operators experiment with communications based on reflected signals from the Moon.

This type of activity also needs to be protected whenever innovation zones are established by the Commission.

Recommended Actions

The Commission should establish rules that explicitly prohibit the creation of an innovation zone within a given distance of an established or planned radio astronomy observatory. The rules could include a mathematical terrain model that would compute the minimum distance between a radio astronomy observatory and a planned innovation zone.

Also, operation of amateur radio astronomy equipment, and amateur radio equipment, must be protected. This should probably be a negotiated process where an innovation zone in a remote geographic area would notch out any transmissions that would interfere with existing amateur radio astronomers or with licensed amateur radio operators.

Respectfully submitted,

Nickolaus E. Leggett
Analyst, Inventor, and FCC licensed radio operator
1432 Northgate Square, #2A
Reston, VA 20190-3748
(703) 709-0752

April 12, 2011

Appendix A – Summary of U.S. Patent 6,771,935 – Wireless Bus

Abstract: In order to avoid mechanical assembly problems and transmission of undesired electrical currents among circuit cards or boards in a telecommunications switch or similar digital device, a conventional hard-wired midplane bus is replaced by a wireless bus. The wireless bus includes a radio frequency or light wave transceiver on each card. Antennas on respective cards can either be oriented within direct line-of-sight of each other, or can project into a waveguide which directs the transmitted signals past all the other antennas. For example, the waveguide may be a metal enclosure which surrounds all the cards. Alternatively, respective aligned apertures in the cards can define a continuous transmission path. A data rate exceeding 1 megabit per second and a transmission power on the order of 1 milliWatt are preferred, since the bus is intended for use within a single switch housing. Radio frequencies in the middle to high microwave range or light frequencies in the visible range are preferred for providing sufficient bandwidth and to facilitate servicing.

Note 1:

The Radio JOVE project is a hands-on inquiry-based educational project that allows students, teachers and the general public to learn about radio astronomy by building their own radio telescope from an inexpensive kit and/or using remote radio telescopes through the internet. Participants also collaborate with each other through interactions and sharing of data on the network.

The Radio JOVE project began in 1998. Since then, more than 1100 teams of students and interested individuals have purchased our non-profit radio telescope kits and are learning radio astronomy by building and operating a radio telescope. This self-supporting program continues to thrive and inspire new groups of students as well as individuals

The two key components of the Radio JOVE decametric radio telescope are a radio receiver and an antenna array designed to operate at 20 Megahertz. For Radio JOVE, these items are typically built from kits developed by the Project.

http://radiojove.gsfc.nasa.gov/

Note 2:

For information refer to the Society of Amateur Radio Astronomers at the web site: http://www.radio-astronomy.org/

In compliance with Commission rules, I have sent a printed copy of this reply comment by the US Postal Service to the following address:

Dr. Harvey S. Liszt

Spectrum Manager

National Radio Astronomy Observatory

520 Edgemont Road

Charlottesville, VA 22903-2475