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

In the Matter of	)	
	)	
Amendment of Parts 1, 2, 15, 90 and 95 of the Commission's Rules to Permit Radar Services in the 76-81 GHz Band	)	**ET Docket No. 15-26**
	)	
Amendment of Part 15 of the Commission's Rules to Permit the Operation of Vehicular Radar Systems in the 77-81 GHz Band	)	**RM-11666**
	)	
Amendment of Sections 15.35 and 15.253 of the Commission's Rules Regarding Operation of Radar Systems in the 76-77 GHz Band	)	**ET Docket No. 11-90** **RM-11555**
	)	
Amendment of Section 15.253 of the Commission's Rules to Permit Fixed Use of Radar in the 76-77 GHz Band	)	**ET Docket No. 10-28**
	)	
Amendment of the Commission's Rules To Permit Radiolocation Operations in the 78-81 GHz Band	)	**WT Docket No. 11-202**
	)	

To the Commission:

Reply Comments of Nickolaus E. Leggett, N3NL in Response to the Comments of the National Radio Astronomy Observatory (NRAO) and the Committee on Radio Frequencies (CORF) – National Academy of Sciences

I am a certified electronics technician and an Extra Class amateur radio operator (call sign N3NL). I also 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 have studied astronomy and government at Wesleyan University in Middletown, CT.

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 one of the petitioners in the docket to establish a low power radio service on the AM broadcast band (RM-11287). I have filed a total of over 200 formal comments with the FCC over the years since the 1970s. I have filed comments with other Federal agencies as well including the USPTO, FAA, FERC, EPA, and the TSA.

General Comments

Both the National Radio Astronomy Observatory (NRAO) and the Committee on Radio Frequencies (CORF) express concern about the impact of automobile radar on radio astronomy observations in the millimeter (mm) waves. As a former astronomy student, I agree with their strong concern. As they point out, the basic problem is that the celestial radio signals are very weak compared to the stray signals from the automobile radar.

The NRAO and CORF point out that the millimeter waves are very useful for basic and important astronomical research. Humanity needs to maintain scientific access to these frequencies.

Specific Comments

It is suggested by these professional astronomers that automobile radars could be designed so they could be turned off when the radar is in the vicinity of the radio observatory. This shutdown could be accomplished by an onboard automatic system that would use Global Positioning System (GPS) signals to determine when the automobile is near to the observatory. Alternatively, the automobile radar could be equipped with a simple manual on/off switch. Signs

would be installed on the roads near the observatory directing the automobile drivers to turn off their car radar.

This approach to interference has significant problems. The GPS-based system would only respond to the needs of the established professional observatories that are entered in the radar system's data base. This system would not detect the presence of any new professional observatories using the millimeter waves. In addition, the GPS-based system would not detect any amateur-built millimeter-wave observatories at all. As a result of this, amateur astronomers would be blocked from building their own radio observatories in this frequency range by the radar signals from thousands of automobiles. This inherent bias against new observatories is unfair.

The manually switched system would be more flexible than the GPS-based system, but it has no method for making sure that the drivers actually turn off their radars. Indeed, some wise guys would try to jam the observatory by leaving their radars on and pointing their cars at the observatory's antennas.

There is also a potential legal problem with an automobile radar shut-off system. If the radar is shut off and the motorist has an accident due in whole or in part to this shut down, who does the motorist take to court: the astronomical observatory, the car manufacturer, or the state authority that put up the road signs? One can see some obnoxious litigation happening in these cases. This type of situation would be especially crippling for the amateur radio astronomers who definitely could not afford to defend themselves in a legal case. It is hard enough to build a millimeter-wave radio telescope without this legal burden added to the activity. We need to encourage these amateur experimenters and inventors instead of crushing them with legal consequences.

The comments from the NRAO point out that the signals from the radars can actually damage or disable the highly sensitive receivers used by the observatories. The professional observatories can protect themselves from this problem by locating their antennas in extremely remote areas of the nation or the world. In addition, the professional observatories can locate their antennas far from any public roads. Amateur astronomy observatories generally don't have this option and most of them are located near public roads. Amateurs would be protected somewhat by the fact that many of their receivers would not be as sensitive as the ones used by the professionals. The less sophisticated receivers would presumably be less susceptible to damage from the automobile radars travelling down the local roads.

Radio Astronomy Cannot Change Frequency

The natural radio sources observed by radio astronomy have frequencies that are permanently fixed by nature. This suggests that radio astronomy should have a lasting priority on these frequency bands over automobile radars. In contrast, the automobile radars can be operated on other millimeter frequency bands that are not in such a direct conflict with radio astronomy. Thus the automobile radars could be moved away from the most critical millimeter-wave frequency bands used by radio astronomy.

Amateur radio is less ubiquitous than automobile radars and would be much less of a problem for radio astronomy. In many situations, interference could be avoided by the amateurs using high gain antennas that would restrict their signals to a narrow beam width that usually would not be pointed at a radio observatory. In the few cases of direct interference from amateur radio operators, the situation can be worked out on a case-by-case basis. In these negotiations, it is important to remember that the absorption of the radio waves in the frequency bands in question is not as strong as was assumed in the past.

Respectfully Submitted,

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April 3, 2015

In response to Commission regulations, paper copies of my reply commentsff have been sent to the NRAO and the CORF at the addresses below.

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