From: Stephen Frasier

To: Behnam Ghaffari
Date: February 09, 2018

Subject: 0022-EX-CM-2018

Message:

The purpose of amending our mobile license is to accommodate a new radar system for rapid scanning of tornadic storms. This unique radar has been obtained by UMass from Raytheon for research use. As our current mobile license does not include the operating frequency of this radar, we are requesting a modification to our license to include it. We are not able to change the radar's operating frequency.

UMass has been funded by the National Science Foundation to study severe storms in the Midwest and Great Plains during spring/summer 2018--2019, and possibly 2020. This work is in collaboration with Purdue University. The NSF Grant is AGS-1741088 entitled “Collaborative Research: Polarimetric Tornado Precursor Signatures” with an award period of 11/15/2017—10/31/2020. The dual-polarized phased-array radar is necessary to accomplish rapid (electronic) scanning of storm morphology to deduce areas of outflow and updrafts from the polarimetric signature of the echoes (specifically, Zdr, the ratio of horizontally polarized echo to vertically polarized echo). This rapid diagnosis of the overall storm structure is not possible with our existing mechanically-scanned radars.

This radar operates at a center frequency of 9.6 GHz. Peak power is approximately 100 W, and the antenna aperture is approximately 1 square meter, yielding an ERP of 1000 kW. Half power beamwidth is 2 degrees. The pulses are FM chirps of up to 50 usec duration and up to 20 MHz of bandwidth. The pulse rate is 5 kHz or less. This radar will be mounted on our truck and operated similarly to our other research radars.