

This exhibit accompanies a request for modification of experimental class license associated with file no:0257-EX-CN-2020, callsign:WK2XZJ.

The licensed stations are used in pursuit of a grant from the Air Force Office of Sponsored Research no. FA9550-23-1-0164. The purpose of this research is to study ionospheric radio wave propagation and its impacts on critical operational systems, including DoD and civilian systems. We require the use of a number of low-power beacon transmitters operating on the low HF bands. A number of beacon receivers support this research. Our unique HF transmitters employ PRN coding much like GPS signals, and the observable data include time-of-flight, Doppler shift, and amplitude for each of the possible ray paths. Measurements of signals from pre-existing stations and signal sources are unsuitable for the project. Data from our entire HF network allow us to specify the regional ionosphere completely and to observe and mitigate propagation problems associated with space weather. The reconstructions improve with the number of transmit and receive stations employed. The ionospheric specification method we use is computationally intensive and completely novel.

An especially novel component of the research is the incorporation of the University of Alaska, Fairbanks, HAARP research facility in Gakona, Alaska, which can modify the ionosphere in prescribed ways. Our research is performed in cooperation with research efforts at HAARP.

The modification we are requesting is the addition of a beacon transmitter in Homer, Alaska. The ray path from Homer to one of our receivers in Eagle Village passes directly over HAARP, and the measurements of the signal will permit quantitative studies of the effects of ionospheric irregularities on HF propagation.

The existing license for WK2XZJ is due to expire next summer. At that time, we will seek renewal for the overall, modified license.