

Part 5 Application, Question 7

Exhibit detailing program of research and experimentation proposed including description of equipment and theory of operation, and specific objectives to be accomplished (a and b).

This application is a continuation and expansion of research and experimentation conducted by WD2XDW at 137 KHz and now to be expanded to the 505Khz range. The owner operator having been moved a number of times within the USA and the overseas for the past couple of years, has now returned to Alaska and will be located only 62 Kms NW from the original Grant 0102-EX-PL-2003 near Anchorage AK.

This program is expected to continue for a minimum of 5 years, given changes into solar conditions coming out of the 2006/7 sunspot minima, and a long base line in time is required.

Research.

Research continues in a number of areas, including E and F propagation via Skywave at 137Khz and 505KHz on Transpolar paths to Europe and non Polar paths to Asia-Pac during various ionospheric conditions, namely the affects of heavy elements propagated into Polar regions during disturbed geomagnetic conditions or sourced from various outpourings from the Solar Disk, having various attenuative or positive affects on signal propagation. Other effects including weather, ground impedance, and the effective on the antennae performance close to trees will also be undertaken.

The mobile part of the application is to allow Short base line measurements up to 250Kms from base using portable transmission and reception equipment which will investigate the differences in ground wave propagation between 137 and 505 KHz in sub Arctic terrain and consider the various ground permittivity's. In particular locations that propagate over thru mountain ranges which surround this location in a large arc and are up to 14,000 ft in height..

Various transmission modes will be used to investigate their effectiveness; these range, from simple on off keying thru to heavily error corrected modes such as "WOLF" and minimal frequency shift keying modes. The radio system is designed for two way communications and per previous grants will be taken with other similarly granted part 5 experimental stations, and foreign amateur radio operators who are authorized to use the bands.

The transmitters are the same or similar as used in the previous grant, and consist of owner built class D, or heavily modified Decca Loran Ex-1 transmitter, or Class A/B Power amplifiers required to produce the amplitude and phase waveforms for some of the digital modes. Signals will be generated from hand or machine generated Morse code at the simplest level, thru to being generated via computer. The use of very stable signal source is required and the station will use DDS systems with millihertz frequency accuracy and long term phase stability. These are required for long term and very weak signal reception at the various monitoring sites over the globe,

Real time status of transmissions, log, and reports and will be shown via a web link <http://kl1x.com>

The antennae used will be the same as used in the last site in Bartlesville OK, namely a small tree mounted loop using thick conductors and using a loop high current remotely controlled tuning unit. Antennae currents will vary dependant on which of the two bands are being used and a smaller loop within the same trees may be constructed for the 505KHz band as its operation and mode changes given the loops parameters. Loop current at 1Kw carrier output approaches 45-50

Amps so mechanical and electrical design of the coupler has been a strong research and learning point, Filtering and the very high Q of the loop reduces any out of band spuri to a very low level.

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In addition to the above objectives this study will continue the study and proof on how effective ground and sky wave communications can be realized between two or more stations, optimization of digital receiving techniques using coherent or non coherent techniques and, optimization and variations in effectiveness of small lambda transmitting loops at LF/MF.

The applicant is a communications engineer by profession with some 35 years experience in general and military broadcast systems and holds the callsign KL1 X

Lastly, in the allocation in the 505-515 KHz the applicant is willing to reduce the frequency spread to meet any concerns, but would prefer to match similarly approved part 5 grantees allocations.

Laurence Howell IEng MIET FRGS