Revision A: Outline for DCC Paper. DCC 2020 Originally Charlotte, NC Sept 11-13. Now going Virtual (same dates)

Submission Deadline: ~ Aug 1 2020 (need to confirm)

**IONOS SIM HF/VHF Ionospheric Channel Simulator**

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**ABSTRACT**

This paper outlines the hardware and software development and example applications of a microprocessor based stand-alone channel simulator built on the Waterson model. The simulator can be used to model 5 common HF Channels and 3 common VHF/UHF FM channels using 3 KHz or 6 KHz bandwidth. A simplified user interface is described along with basic simulator documentation. Several application examples are described that cover popular HF and VHF protocols showing operation at various S:N levels across both multipath HF and fading VHF/UHF channels.

Outline:

1. Introduction and need for /value of channel simulation
2. Watterson model (Paper 1970, Johan B. Forrer, KC7WW DCC date?)
3. The basic approach: DSP implementation. CCIR simulator guidelines (Reference)
4. Teensy Microprocessor Implementation: Hardware support needed. DSP Audio Library. Example pictures. Basic schematic, PCB, Prototypes.
5. Software development: Arduino IDE. Teensy Audio Library. Block diagram showing DSP data flow. MIT Open Source Initiative software release.
6. Built in Test and calibration verification.
7. Simulator Application. Setup diagram and photos. Simulation strategy and details
8. Simulation results of several popular HF and VHF protocols across channel types.
9. Summary