SUMMARY

According to a first aspect of the present invention, there is provided a system comprising:

a first communication node configured to transmit a first data signal as an electromagnetic wave along a first data transmission path using skywave propagation and to transmit a second data signal along a second data transmission path; wherein the first data signal is identical to second data signal;

a second communication node configured to receive the first data signal and the second data signal transmitted from the first communication node, and wherein the second communication node includes a processor configured to decode and compare the first data signal to the second data signal received at the second communication node;

wherein differences between the first data signal and the second data signal received at the second communication node indicate distortion caused by skywave propagation; and,

wherein the distortions in the first data signal are communicated to the first communication node so that a third data signal transmitted by the first communication node is preconditioned to correspond with the distortion caused by skywave propagation.

According to a second aspect of the present invention, there is provided a method comprising:

sending a first data signal from a transmitter to a receiver by a first data transmission path using skywave propagation;

sending a second data signal from the transmitter to the receiver by a second data transmission path; wherein the second data signal is identical to the first data signal;

decoding the received first data signal and the received second data signal at the receiver;

comparing the received first data signal to the received second data signal, wherein differences between the received first data signal and the received second data signal indicate distortions caused during the skywave propagation of the first data signal;

transmitting data regarding the distortions in the received first data signal from the receiver to the transmitter; and,

preconditioning a third data signal; wherein the preconditioning of the third data signal corresponds to the distortions in the received first data signal.

According to a third aspect of the present invention, there is provided a method comprising:

transmitting a preconditioned data signal from a first communication node using skywave propagation;

receiving the preconditioned data signal at a second communication node;

performing a first decoding method on the data signal;

performing a second decoding method on the data signal at the same time as the first decoding method;

processing the data signal resulting from the decoding method that is quickest to decode the data signal.

Skywave propagation may be used to provide a low-latency communication pathway for data between remotely located transmitter and receiver stations. Ionospheric and other atmospheric conditions may cause distortion of a data signal transmitted by skywave propagation. Generally speaking, monitoring ionospheric and other environmental conditions may allow a transmitter to change or precondition a data signal to the current conditions such that the current atmospheric conditions effectively unscramble or remove noise from the preconditioned signal when received at the receiver station. The overall system is designed to minimize latency as well as reduce noise of the signal. In this system, a fiber back channel provides a copy of the data signal transmitted via skywave propagation. At a receiver station, the data is decoded. Based on the copy of the signal originally received from the fiber channel, the receiver station can determine what distortions occurred in the atmosphere as it unscrambles the signals transmitted via skywave propagation. Once it receives these parameters, it transmits some or all of this information back to the transmitter station via the fiber channel and/or via skywave propagation. The transmitter station then preconditions one or more of the next signals that are transmitted via skywave propagation.

Preconditioning reduces any type of downstream processing time required to unscramble or remove noise from the signal. In other words, the environmental conditions are in essence performing some or all of the descrambling so as to reduce processing time at the receiver. In one variation, the system can precondition multiple variations of signals to be transmitted. These items can correspond to a particular trading strategy that is used and/or news impacting the trading strategy. The trader can then pick an item from the list to be transmitted and the particular information signal can then be immediately transmitted via skywave propagation.

While the system will be described with reference to executing financial trading strategies, this system and technique can be used in other situations or industries where time and bandwidth are of concern. For example, this system can be used to perform remote surgery or medical diagnostics, scientific instruments or studies (e.g., for astronomy or physics), controlling dispersed global computer networks, and/or military applications. This system and technique can for example be adapted for incorporation into earthquake/tsunami early warning systems. Certain remote deep water earthquake sensor may provide a signal to institute a complicated cascade of actions to protect designated population centers and associated infrastructure depending on the severity and type of earthquake. For instance,