SUMMARY

A modern management system includes a system and method for equalizing data sent via a first communications channel using a second communications channel. More specifically, wireless channels are known to introduce a variety of data transmission impairments including echoes, frequency selectivity, frequency shift (due to Doppler Effect) and delay spread, any of which will reduce the reliability of correctly receiving the signal.

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

a first communication node including a modulator and a transmitter configured to transmit a first data signal and a second data signal, wherein the second data signal includes information corresponding to the first data signal;

a primary channel for transmitting the first data signal;

a secondary channel for transmitting the second data signal;

a secondary communication node including a receiver and a demodulator configured to receive the first and second data signals transmitted from the first communication node;

wherein the secondary communication node is configured to compile distortion data by comparing the received first data signal to the received second data signal; and

wherein the distortion data is sent from the second communication node to the first communication node using the secondary channel.

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

transmitting a first data signal from a first communication node to a second communication node over a primary channel;

transmitting a second data signal from a first communication node to a second communication node over a secondary channel, wherein the second data signal includes information corresponding to the first data signal;

demodulating the first data signal and the second data signal received at the second communication node;

comparing the first data signal to the second data signal as received at the second communication node to compile distortion data based on the differences between the first data signal and the second data signal;

transmitting the distortion data from the second communication node to the first communication node over the secondary channel; and

inputting the distortion data into an equalizer algorithm to reduce distortion in future transmissions over the primary channel.

The system includes equalizing a primary, low-latency communications channel using data sent via a separate, higher latency secondary channel to reduce interference and associated errors. Redundant data is sent in the same direction on the secondary channel, thereby increasing the first channel's usable capacity, and allowing messages to be transmitted on it with lower latency. The redundant data may be a complete copy of the primary channel data or some partial/condensed version of the data. For instance, every N^{th} frame of the primary data can be sent. The redundant data sent on the secondary channel is compared with signals previously received on the primary channel. This comparison allows characterization of any distortion, and any adaptive equalization coefficients that may be necessary to reverse the distortion appearing in future data transmissions. This advantageously avoids sending added data known in advance and/or employing additional channel coding redundancy for in-band equalization of the first channel provided there is minimal change in the first channel's equalization coefficients before applying correction data from the second channel.