Methods and Devices for Interference Cancellation in Radio Frequency Communication Systems

This patent details the technique and apparatus for carrying out communications that use a radio frequency comprised of a signal and an interference component. The interference signal is generated at a control center, sent to an antenna site via fiber optics and transmitted to another control center, aircraft or ship.

Scientists at UCF have devised a communications system capable of detecting desired signals without interference from sources of noise. This system makes use of a control center and an antenna site for the generation and sending of radio frequency (RF) signals. Signals are generated by laser and transferred from the control center to the antenna site via fiber optics. The most important part of this system is its ability to save a copy of the interference signal generated from various electronics and equipment at the control center. The saved interference is then used to subtract out interfering signals from the desired signal. This allows for the detection/reception of weak signals hidden in or blocked by interference. This system also operates over a wider frequency range (2 to 2000 MHz), and makes use of strong power signals.

Technical Details

The Joint Tactical Radio System (JTRS) is a family of affordable, high capacity tactical radios that will be used by military airborne and shipboard systems in the future. This system will provide both line-of-sight and beyond line-of-sight capabilities to the soldiers of the future. One of the most common problems with JTRS systems is the close proximity of the RF transmitter to the receiver. This causes the receiver to pick up large amounts of interference from the transmitter, washing out the desired signal. Additionally, these systems do not provide the desired dynamic range of frequencies (2 to 2000 MHz) needed for such applications.

Benefits

- Reduces and/or cancels signal interference
- Works over a wide range of frequencies (2 to 2000 MHz)
- Achieves a signal power of -114 dBm at 25 kHz bandwidth or -100 dBm at 10 MHz bandwidth

Applications

- Military
- Joint Tactical Radio Systems developers and manufacturers

Technology #30849

- US Patent 7,856,184 B2

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