Technical Review: Radio Control

Radio control of a vehicle is necessary when trying to break the restraints of wired human control and energy supply. Radio signals can be used to remotely control anything connected to the receiver whether it is a human or another computer. In actual fact the first use of radio control was by Nikola Tesla where is showed a an on looking crowd of people a boat that seemed to make decisions based on the voice of the people when actually he was the one controlling it.

Radio is a form of electro magnetic wave that utilizes charged particles propagating throughout space at a frequency desired in the radio band [1]. A lot of information can be gained from the incoming waves such as amplitude so that the gain of the wave can be solved, the current frequency can be checked so that different function can be executed based on a discrete number of frequencies [2], and the phase of the wave which will vary depending on different media that it propagates through. Frequency modulation is the most prominently used method for wireless information transmission. Simply put frequency modulation (FM) sends information by varying the frequency which will be directly correlated to a numerical value or command on the receiving side of the system. The reason why FM is more commonly used is because of its ability to withstand some minor noise problems. In amplitude modulation noise can spike the amplitude drastically and can also dampen so that noise problems can’t be solved unless special filters are created. Phase modulation gains noise from varying media throughout space so that the final signal is unknown if the medium parameters are unknown.

Radio controlled vehicles can use many of these mentioned forms of transmission and reception of radio signals however, there are much more simple ways to implemented information transmission. Radio controlling uses a method of pulse generated on a single frequency to transmit commands. The idea is to take a single known frequency, pad it with a couple of start and stop pulses and then create a lookup table that says if there are x amount of
pulses then execute this command [3]. However, it is possible to encode more than one signal into a single frequency using multiplexing and demultiplexing techniques [4]. A few examples include time division multiple access (TDMA) [5], code division multiple access (CDMA), and frequency division multiple access (FDMA). The idea here is to take a single narrow band that is currently being underused and control more than one module with it by dividing the signal up into timed packets, coded packets, or frequency varied packets.

Many radio controlled vehicles utilize a frequency around 24 kHz in the spectrum but recent discovery of the 2.4 GHz band will allow for a multiple channels to be transmitted on one transmitter. This allows more than one transmitter in the vicinity to transmit on the same frequency band. Average price cost around $20 to $30 for a 6-channel transmitter and for the receiver that utilizes frequency demodulation price ranges between $15 and $50 depending on the receivers ability to demodulate various frequencies [6].
Work Cited


