Podcast

Theory

Everyday we are surrounded by waves but rarely do we stop and think what they are. At its basic it a transfer of energy through a medium which can occur in two forms.

Transverse waves consist of particles which oscillate perpendicular to the direction of travel of the wave. Water waves at the surface are an example of this. On the other hand, longitudinal waves are caused by particles which oscillate parallel to direction of wave travel. Sound waves are examples of this.

By causing rapid vibrations in the air, it is possible to cause particles to “push” particles in a certain direction. As they in turn push other particles along the same line, energy is transferred and hence a wave is formed.

The speed at which sound travels at, is dependent on various factors such as the density or temperature.

If this speed is known, we can send out a sound pulse and record the time for it to return. Using this, we can calculate the distance between the pulse receiver component and the object (Equation?).

Specific components to do this exist. However, we decided to take this a step further and map the surrounding area in 3D.

If the orientation of the sensor is known, then we can project a measured distance into 3D space and therefore create a model of the surroundings. In order to do this we needed one more component...an accelerometer.