Decreasing Ferromagnetic Interference on the Position and Orientation of a Sensor in a DC Electromagnetic Tracker

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Electromagnetic trackers have applications in many different fields including, but not limited to, 3-D measurement and analysis of human movement for biomechanical studies, 3-D animation, military applications such as tracking line of sight in aircraft helmets, and tracking medical instruments in the body. For each of these applications, ferromagnetic metal interference is the main cause of measurement error in position and orientation of the sensor. Ferromagnetic metals have a response to external electromagnetic fields called eddy currents. These are induced currents in the metal which then produce their own magnetic field, disrupting the original transmitter signal. This project proposes to examine a stationary transmitter and receiver at a known position and orientation, and then introduce a metal sheet at a known location. We propose that the sheet of metal will act as a second transmitter source, and therefore can use Euler angle transformations to correct the interference in the sensor. By knowing the location of all three objects, we can compare the measured and predicted error. If they are the same, then we can correct for the metal interference. We hope to find a correction for the ferromagnetic metallic interference.