Coordinate Transformations for Mapping Magnetic Field Anomalies in 3D Space Utilizing Commodity Hardware NICOLE GAGNON, Duke Univ — The M3S project, derived from Magnetometer 3D Scanner, aims to develop and implement an instrument for the real-time mapping of magnetic field strengths in 3-space over an extended volume. Three-dimensional digital mapping enables a closer study of the real world and should aid in the detection and identification of magnetic field anomalies. To accomplish this, a quaternion optimization algorithm is used to map points in a two-dimensional image of an object to the points of that object in three-dimensional space. Creating Python libraries for projection, calibration, plotting, and light tracking will allow for the desired mapping. A working prototype, a unique coupled device consisting of a Wii remote and magnetometer, is to be developed in the near future. This novel device has potential applications for diagnostics in many fields related to electrical engineering, quality control, medical imaging, and possibly other unrealized applications.

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