

Senior Design Project Description for FALL 2016

Project Title: Two-axis Magnetic Field Sensor Near Distribution Lines (EPRI_MFS)

Supporter: EPRI

Supporter Technical Representative: ASSIGNED

Faculty Mentor: _____ ASSIGNED TBD (check one)

Single Team Dual Team _____ (check one)

Personnel (EN/ET): 3 E, _____ Cp, _____ Cv, 1 M, _____ SE

(Complete if the number of students required is known)

Expected person-hours: (250 per student)

Description of Project:

As a part of an EPRI sensor research effort, a need has arisen for the development of a low cost sensor for the measurement of magnetic fields in two axis that are generated by a single or three phase electric distribution line. The preferred sensing method for this sensor is the use of magnetoresistive technology though coils may be used so long as they are small. The sensor will be used to measure the x and z components of the magnetic field when placed on a wooden pole or steel structure.

Initial Project Requirements (e.g. weight, size, etc.):

The sensor is to be capable of detecting a fallen or low hanging conductor when placed on a wood pole. The developed sensor should report the rms quantities of the sinusoidal magnetic field between ± 2 Gauss with a ~ 0.01 mGauss resolution using a 0-5V output signal. The overall cost of the completed sensor should be less than \$50.

Expected Deliverables/Results:

A prototype of the sensor is to be fabricated and tested. It should be complete with fabrication drawings, circuit drawings and operating manual. A report of the testing performed is to be provided.

List here any specific skills or knowledge needed or suggested (If none please state none):

Electrical engineering students should be familiar with analog circuit design and electromagnetic fields.

Mechanical engineering student should be familiar with rapid prototyping.