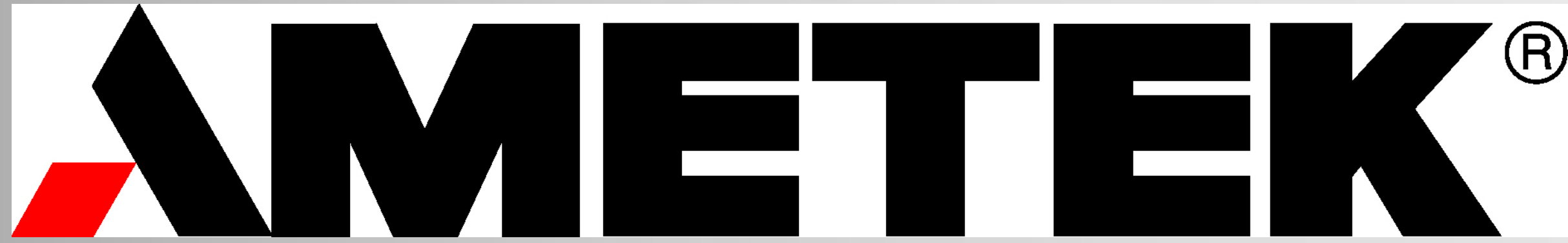


Ametek Aerospace Internship, Summer 2008

Andrew Stutzman, Electrical and Computer Concentration



Ametek Aerospace is a company that designs and produces parts for airplanes. The department I worked in, located in Sellersville, Pennsylvania, designs airplane fuel gauges for customers such as Honda Jet. There were five people working in the department.

Pitch and Roll Detector



Pitch is the angle of rotation about the wings of the airplane. Roll is the angle of rotation about the airplane's fuselage. Depending on the placement of the fuel gauges in the airplane's fuel tanks, change in pitch and roll can change the volume measurement. I designed a device that could be used to measure the pitch and roll of an airplane (pictured below). An accelerometer was used to measure the angle of rotation. A firmware design was used to convert the accelerometer signal into a pitch and roll measurement. These ideas may be used in future fuel gauge designs.



Airplane Fuel Gauge Concepts

The design concept for an airplane fuel gauge is fairly simple. The gauge consists of two concentric metallic cylinders which have a certain capacitance. As the level of fuel inside the cylinders changes, the capacitance changes, because the fuel has a different dielectric constant than air. The design of the fuel gauge involves building a circuit that can measure and process the capacitance signal and convert it to a fuel volume. Parameters such as fuel sloshing, angle of pitch and roll, and refueling affects must be accounted for.

Firmware Debugging

I spent three weeks of my summer debugging the C code for the firmware design of a fuel gauge system. I used Microchip's MPLAB IDE for this project. I fixed some problems, but the design is still not fully functional.

Miscellaneous Jobs

The rest of my time was spent performing miscellaneous jobs such as drawing electronic testing equipment on Microsoft Visio, calling companies to get quotes on materials, and performing statistical analysis. In my spare time I designed and installed a circuit that lit an LED above the boss's office door whenever he was on the phone.

