Needs Assessment & Project Scope

EML 4551C – Senior Design – Fall 2011 Deliverable

Team # 19

Google Mobile App for Compressor Performance (GE)

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Project Sponsor
General Electric

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Needs Assessment

The compressor industry has existed for over 100 years. Throughout this time, companies like General Electric (GE) have competed to make their product state of the art in respect to size, speed, and efficiency. Recently, there has been a desire to integrate newer technologies into GE's products to further distance themselves from the competition in terms of innovation. This desire has arisen from the need to analyze information more efficiently, and to utilize tools readily available to engineers around the globe. The purpose of our project is to create an inexpensive and efficient system for analyzing fluid flow by incorporating sensors into a platform compatible with a google mobile device. This allows flexibility by the operator unlike anything else in the field, introducing the ability of flow analysis from across the globe. The majority of technical issues for a compressor are on flow, and a handy solution involving simple and common instruments will greatly improve GE's ability to fulfill contractual maintenance services.

Project Scope

Problem Statement

There is currently not a product available that is cheap to ship overseas, can be easily used and collects airflow data from a safe distance to be analyzed on a mobile phone. In order for this product to be considered easy to use, the product setup time should be relatively short and must not require modifications to the compressor itself.

Justification/Background

There are currently systems that analyze compressor performance that are very expensive to ship overseas. In one case, GE spent millions of dollars sending employees to Africa for months to fix a client's compressor to find that the client's measuring equipment was setup incorrectly. This was found after GE decided to ship their expensive flow analyzing equipment. If GE had the Google mobile app product, they could have saved a great deal of money since they could have cheaply sent out the app and equipment right away. A real world example such as this is a motivating factor for this project.

Objective

Create a product that measures airflow (and any other possible metrics), sends the data out and plots it on a mobile phone and/or personal computer. Proper sensor placement needs to be determined and must not require modification to the compressor itself. The application must be easily used and should allow the operator to compare actual performance versus expected performance.

Methodology

In order to effectively implement a new and useful data acquisition system for natural gas compressors, we must first understand the most important aspects of compressor efficiency and sources from which problems commonly arise. At the most basic level, we need to know which metrics should be measured. There is already a diagnostic system in use by GE engineers, made by Windrock Inc., which can give us a great idea of which data is the most useful. We should research how it gathers its data - what types of sensors it uses, what type of special installation is required, etc. We have also been given contact information for a number of engineers who are involved with compressor performance, whose wisdom will likely prove irreplaceable. We need to look into what types of sensors may already be permanently installed on the compressor from which we may be able to collect our data. Since it is most desired to avoid interrupting the compressor's operation, using existing instrumentation to its fullest potential is crucial. If more instrumentation is needed, its selection should prioritize the quickest and least intrusive installation possible. Once the necessary types of sensors have been selected, we need to decide which wireless data exchange type to use for them to communicate with the phone, whether it is bluetooth, infrared, wireless network and/or internet or something else, and then we can source what sensors are available that work with our selected data exchange type. After these communication issues are solved, the phone app itself can be written and tested. The final step in the process would ideally be to test our entire system on a functioning compressor. If we find that this is not possible, we may be able to simulate the parameters that a normal compressor would induce on our sensors to test the functionality of the communication between sensors and phone, and to test the phone app itself.