Real-time Monitoring and Diagnostic Solution for an HVAC System

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Sponsor: Qualtech Systems, Inc.
Outline

- Qualtech Systems, Inc.
- TEAMS
- ITE Building
- Past ECE Teams
- Progress
- Objectives
- Timeline
Qualtech Systems, Inc.

- East Hartford, CT
- Founded in 1993
- Krishna Pattipati
- Maintenance programs with guided troubleshooting
- Projects for NASA and U.S military
- TEAMS
TEAMS

- Testability Engineering and Maintenance System
- Multiple Components
  - TEAMS Designer
  - TEAMS RDS (Remote Diagnostic Server)
  - TEAMS RT (“Real-Time” Data Collection)
TEAMS Designer
- Creates a model of a system
- Includes components with respective test points
- Can be used to model a complex system
TEAMS RDS
– Online Server that connects all components
– Decides which component is most Likely failing
– Provides Possible Solutions during Manual Maintenance
– Stores information for future analyses
TEAMS

TEAMS RT
– Provides diagnostics in Real-Time
– Connects developed code with generated sensor values to TEAMS RDS
– Allow for constant connection
ITE Building

- HVAC system located in penthouse
- Split into two subsystems
- Cold water and steam pumped from basement
- Multiple sensors on each floor
- Sensor values sent to facilities website
ITE Building

Information Technology
AHU -2
Located in Penthouse West
Serves the 3rd & 4th Flr / West Side Office Areas

Return Air
Temp: 71.9 Deg F
Humid: 33% % RH
CO2: 382.5 PPM

4th Floor
Return Air
Smoke Damper
RA Smoke Alarm
On
RA Smoke Dimpers
On

3rd Floor
Return Air
Smoke Damper

2nd Floor
Return Air
Smoke Damper

1st Floor
Return Air
Smoke Damper

4th Floor
Lobby

3rd Floor
Lobby

2nd Floor
Lobby

1st Floor
Lobby

Return/Exhaust Dampers
42% Sgrl

CO2 Dmdn: 9000 PPM
Max CO2 Dmdn: 3600 PPM

Outside Air
13.1 % OA Extentivity

Supply Fan
Speed: Sgrl
Fan: Sgrl
Pre-Filt: Off
Final Filt: Off
Mixed Air Swp: 62.0 Deg F
Mixed Air Temp: 62.5 Deg F
Face & Dynamics: 100% Sgrl

Supply Fan
Speed: Sgrl
Fan: Sgrl
Pre-Filt: Off
Final Filt: Off
Mixed Air Swp: 62.0 Deg F
Mixed Air Temp: 62.5 Deg F
Face & Dynamics: 100% Sgrl

Supply
Temp: 92.8 Deg F
Solvent: 92.9 Deg F
Inhibit: 42% % RH

Supply Static: 2,56% in WC
Supply Static SP: 2.3% in WC

CA Temp: 77.1 Deg F
CA Humid: 45% % RH

Steam
Cond.
CHWS
CHWR

Preheat
Value: 37% Sgrl
Cooling
Value: 37% Sgrl
Humidity
Value: 37% Sgrl

4th Floor
Exhaust

3rd Floor
Exhaust

2nd Floor
Exhaust

1st Floor
Exhaust

Lecture Hall
Concourse
1st Floor
2nd Floor
3rd Floor
4th Floor
ITE Building

HVAC DIAGRAM ITEB 3rd FLOOR
Prepared By: Ruben Pena
August 11, 2011

UCONN
Past ECE Teams

- 2 years, 2 different teams
- TEAMS Designer model created
- Ran out of time processing facilities data
Progress

Get the Data

- Created a web browser for java to access the website
- Wrote form to access and send to website to automatically send data to our program to parse
Generate Text Results

- Set up to take data points from the sensors every 5 minutes
- Wrote to text file
Objectives

- Do error detection using the data received from the website to determine if there is a fault in the system or not.
Objectives

- Send to TEAMS RT
- Write in C++
- Generate Test results to test TEAMS
## Timeline

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<td>Write to Teams</td>
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<td>Adding More Error Detection</td>
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Any Questions?