

**Advanced Automated HVAC Fault
Detection and Diagnostics
Commercialization Program**

Final Customer Review Report

CONSULTANT REPORT

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Prepared By:

Field Diagnostic Services, Inc.



Arnold Schwarzenegger, *Governor*

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CALIFORNIA ENERGY COMMISSION

Prepared By:

Field Diagnostic Services, Inc.
446 Lincoln Highway
Fairless Hills, PA 19030

Program Director

Vernon Smith
Architectural Energy Corporation
Boulder, Colorado
Commission Contract No. 500-03-030

Prepared For:

Chris Scruton
Contract Manager

Ann Peterson

PIER Buildings Program Manager

Nancy Jenkins

Office Manager

ENERGY EFFICIENCY RESEARCH OFFICE

Martha Krebs, Ph.D.

Deputy Director

**ENERGY RESEARCH AND DEVELOPMENT
DIVISION**

B. B. Blevins

Executive Director

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Table of Contents

EXECUTIVE SUMMARY	5
INTRODUCTION.....	5
FIELD TRIAL CONFIGURATION SUMMARY	7
FEEDBACK FROM PARTICIPANTS	11
Walgreens.....	11
Honeywell GSRC.....	11
California Universities	11
Staples.....	12
FEEDBACK FROM NON-PARTICIPANTS.....	15
CONCLUSIONS.....	17
APPENDIX – SURVEY FORM	19

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List of Tables

Table 1. Field Test Sites For Initial Prototype	8
Table 2. Web Site Releases	10
Table 3. Participant Feedback	13
Table 4. Non-Participant Impressions	15

Executive Summary

The goal of the Customer Reviews (Task 5.7) is to research and document the market's impression of the rooftop HVAC Fault Detection and Diagnostics (FDD) monitoring system, based on feedback from the users involved in the initial prototype field trials. In the spirit of researching the market's impression, we have also included some impressions from interested and informed parties who were not participants in the initial prototype field trials.

Overall, it was difficult to get the customers to be actively engaged with the FDD monitoring system, for a variety of reasons. Nevertheless, customers did offer their opinions about the system and about what they would like to see in such a system. One customer said that although he had concerns about some of the details, he thought the basic concept "was the way to go." Another customer said, "We just need to get smarter about how to use your system." Other responses highlighted the desire to see raw sensor data, the desire to have a more graphic overview on the Web site, a better display on the Web site of the 'health' of the monitoring system itself (e.g., communications failures and sensor anomalies), and the desire to integrate the HVAC FDD monitoring with existing building automation systems.

Introduction

This report presents the customer reviews for the Rooftop Unit Fault Detection and Diagnostics (FDD) System, as defined by Tasks 5.7.1 and 5.7.2. These tasks are summarized below:

Task 5.7.1 Initial Customer Reviews

Review test performance with field test customers, train them on using the product features, and document feedback. The associated deliverable is the Initial Customer Review Report.

Task 5.7.2 Final Customer Reviews

Work with field test customers as they use the product. Collect and use their feedback to improve the design. The associated deliverable is the Final Customer Review Report.

Although these two tasks were originally intended to represent two clear milestones in implementation, the actual experience of establishing and running the initial prototype field trials did not follow the original vision of a clear demarcation between the initial feedback (from all users) and the subsequent feedback (from all users). The field trial users for the initial prototype were added in stages over the past two years, and at each stage the hardware and software comprising the prototype system evolved. Active involvement with the earliest user groups tended to fade as each new user or user group was added with a newer version of the prototype system. In addition, the Web site that presents information to trial participants was added after some of the first participants had joined the trial, and it was modified over the course of the project. (Much of the participants' feedback revolved around the details of the Web site.) In short then, the collection of feedback from users did not follow the original idea that all field trial users would start their participation at more or less the same time such that the feedback from all of them could be documented at that point in an initial customer review report.

Furthermore, even though the field trials involved some 40 units, the number of people directly involved at a level for providing useful feedback was limited. There were basically only four active organizational users, and only four contact people for providing feedback. In order to

achieve the overall goal to “document the market’s impression,” we have included some feedback from other interested parties. For these respondents, there is no initial training followed by ongoing usage. Instead, they were asked to view a demonstration Web site (containing real data, but without any identification of the source) and comment on its ability to convey information in line with the goals of the prototype system.

For these reasons, this Final Customer Review Report contains both initial and final feedback for the participants along with some comments from informed non-participants, as well as a few customer comments that were collected after the Initial Customer Review Report was submitted.

This report is divided into four main sections:

- Summary of the field trial system configurations
- Feedback from field trial participants
- Feedback from other interested parties
- Overall conclusions.

Field Trial Configuration Summary

The overall configuration of the initial prototype system and the timing of configuration changes have had a direct impact on the nature and extent of the feedback from participants. Therefore, before discussing the feedback, it might be helpful to review the field trial configurations.

Field Trial Configurations

During the course of this project, the hardware and firmware constituting the prototype system evolved during the project, as indicated in the Hardware column in **Table 1**. The number and type of sensors for each configuration also changed to some extent. For example, sensors for direct measurement of condensing temperature and evaporating temperature were added at the time the Point Six-based systems were installed. And airflow sensors were added to the California university systems but they did not function properly and were redesigned for the Sentinel prototype installations. The number and type of sensors for the Sentinel prototype are essentially the same as for the Point Six installations.

The initial prototype field trials included 45 units at 9 sites, although this involved only a half dozen customer organizations (in chronological order): Walgreens, Honeywell GSRC, California State University (East Bay), University of California (UCLA and UCSD), Deb Shop, and Staples. (At the time of this report, the Staples installations had still not taken place.) **Table 1** on the following page lists all the sites and units.

At the Walgreens sites, the hardware consisted of the FDSI Virtual Machine (VM) boards and firmware that had been installed during a previous project. The Walgreen sites were the first installations of this version of the prototype, and this VM version was based on hardware that had been developed a number of years earlier. The configuration was cumbersome to install, the processor technology was old and more expensive than later technology, and the system was not designed to be manufactured in large quantities. The individual sensors were wired to the VM units, multiple VM units were wired together, and data were transmitted from there to FDSI via a modem and physical phone line. The timing of the data transmission was set to be once per day.

During the first year of the project, the prototype rooftop FDD monitoring system was redesigned. One of the major changes was the use of Point Six hardware, using Point Six wireless data collection/communications modules. This eased the installation tasks considerably, and was less costly than the previous configuration. On the negative side, a substantial amount of work was required to customize the Point Six hardware (e.g., without modification, the Point Six hardware did not provide a sufficient number of channels), and with the Point Six system there was no means for storing and processing data locally, as had been done with the VM system. This meant that the Point Six systems had to continuously send data back to the FDSI server for processing (once per minute). The use of the Point Six hardware was considered a temporary stage between the old FDSI VM prototype and a new prototype system to be called Sentinel. And the fact that the Point Six systems had to send data minute-by-minute to a central server was considered to be a hindrance to scaling up to a large number of sites.

The Point Six-based version of the monitoring system was first installed at Honeywell GSRC in Atlanta. Nearly a year later, the same Point Six-based system was installed at three California universities.

Table 1. Field Test Sites For Initial Prototype

Site Description	Location	No. of Units	Operational Date	Hardware	Status	General Unit Description
Walgreens – Anaheim	Anaheim, CA	5	2003	FDSI VM	Phased out (essentially ended in mid-2005)	Packaged HP with economizer
Walgreens – Rialto	Rialto, CA	5	2003	FDSI VM	Phased out (essentially ended in mid-2005)	Packaged HP with economizer
Honeywell GSRC	Atlanta, GA	5	December 2004	Point Six	Active	Packaged AC with economizer (1 or 2-stage)
CSU East Bay	Hayward, CA	7	December 2005	Point Six	Active but not being used	Packaged AC or HP (1 or 2-stage) with economizer
UCLA	Los Angeles, CA	8	January 2006	Point Six	Active but no interface to digital thermostat	Packaged AC or HP (1 or 2-stage) no economizer
UC San Diego	San Diego, CA	7	February 2006	Point Six	Active	Packaged AC (1-stage) with gas heat and economizer
Deb Shop	Philadelphia, PA	1	February 2006	FDSI Sentinel Prototype, Beta	Re-installed Nov. 2006 Communications not yet complete	Packaged AC with gas heat and economizer
Staples #84	Philadelphia, PA	3		FDSI Sentinel Prototype	Planned for early 2007	Packaged AC with gas heat and Novar system
Staples #4	Philadelphia, PA	4		FDSI Sentinel Prototype	Planned for early 2007	Packaged AC with gas heat and Novar system

The Deb Shop was the first installation of the prototype using the Sentinel prototype design, and took place almost a year after the first Point Six installations. A location near the FDSI office was chosen to facilitate development and testing. There were a number of problems that prevented the system from operating successfully and work on the Deb Shop installation was suspended in favor of finishing a newer design for the Sentinel prototype. (One of the problems was the fact that a third-party cell phone card was installed in the Sentinel to communicate with the Internet, but it turned out that the Deb Shop rooftop is in an area with spotty cell phone connectivity.) Subsequently, a revised design was re-installed and is collecting data, although a communications link between the rooftop and the Web site has not been re-established. Instead,

the data are stored on a Compact Flash card, and a person must visit the site, retrieve the card, and manually load data into the FDSI server in order to generate diagnostics. A service provider maintains the Deb Shop's HVAC systems, and that service provider has been interested in using the monitoring system. However, because the data are not being communicated to the Web site, the service provider's ability to make use of the monitoring system is limited.

At Staples, the system to be installed is a newer version of the Sentinel prototype. Again, sites near FDSI headquarters were chosen so that it would be easier to work out problems prior to finalizing the design for Task 5.9 which calls for installing the Sentinel on some 60 units in California (some of which might be at Staples stores).

Web Site

The overall configuration also includes a Web site that displays alarms and other unit data, as well as a means for users to respond to alarms. This Web site was not implemented until early 2005, after the first participants had joined the trial. Subsequently, the Web site's functionality evolved throughout the trial period, often in response to requests from trial participants. **Table 2** lists the enhancements added to the Web site for each of the major releases.

Table 2. Web Site Releases

Version	Enhancements
Version 1.08, Dec. 12, 2006	Added pie-chart alarm summary to All Sites page.
	Added page to display sensor data on Unit page.
	Changed the 'start page' (first page after login) to the All Sites page.
	Changed colors for the Web site to improve the look.
Version 1.07, Nov. 16, 2006	Updated refrigeration cycle performance indices plot to display data for multiple stages.
Version 1.06, July 18, 2006	Added stage information to plots and alarms. Previously alarm info pages and plots did not indicate what stage the data was collected for, e.g., for the short compressor runtime alarm the stage was not indicated anywhere. This was fixed in this version.
	Modified Unit Status Page to display 'N/A' for Cooling/Heating performance data when no Last Cooling/Heating Date is available.
	Fixed Outdoor Air damper plot to filter out bad/irrelevant data.
Version 1.05, Feb. 28, 2006	Capability to filter information displayed (site summary, units, alarms, etc.) based on selection of region, area, and office
	Miscellaneous improvements to data presentation
Version 1.04, Nov. 3, 2005	Alarm notification, response tracking, and alarm resolution features
	Expanded security/login features to include additional options for restricting users to specific Regions, Areas, Local Offices, and Sites
	Added heating performance status on Unit Status page
	Expanded help features to include definition of parameters
	Additional data presentation for individual alarms
	Data export capability
	Expanded directory of alarms enabled
Version 1.03, Aug. 31, 2005	Expanded site hierarchy to include Region, Area, Local Office, and Site
	Mechanical cooling efficiency (efficiency index) calculation for individual units and composite value for sites
	Economic analysis of energy savings opportunity associated with mechanical cooling alarms
	Performance history features for mechanical cooling efficiency
	Directory of all alarms enabled

Feedback From Participants

This section summarizes the feedback from each of the field trial participants.

Walgreens

At the time the first prototype (the VM design) was installed at Walgreens, the primary concern was verifying that the system could collect the desired data. In order to work with a local contractor, FDSI established an arrangement with an HVAC service organization local to the Walgreens sites. FDSI then was able to have the local organization work on issues or problems arising from the logged data as well as more general AC problems that were reported directly by Walgreens personnel. (As an example of the latter, the local technicians fixed a short in some thermostat wiring, which was reported because a manager's office had become too warm.) Written diagnostic reports were prepared monthly, but these were primarily of interest to the project participants rather than Walgreens personnel.

During the first year of the project, feedback from Walgreens managers was actively sought through monthly phone calls. However, the nature of the feedback was basically about whether or not the air conditioning was working as expected. For the most part, the Walgreens managers reported that they were comfortable, and were satisfied with the performance of their HVAC equipment. It soon became clear that we were not likely to get useful customer feedback regarding the prototype system from either Walgreens or the local HVAC technicians.

Honeywell GSRC

The prototype based on Point Six hardware was installed at Honeywell GSRC in late 2004. It was also during this period that work was begun on developing a Web site to display summary data and alarms based on the sensor data. The Honeywell GSRC installation did not quite follow the expected pattern of initial feedback, followed by changes to the system, followed by subsequent feedback. Instead, several months after installation, there were a number of rounds of feedback followed by changes, e.g., as input was requested in developing Web site features. One area of particular concern was the alarm management capability, i.e., the Web site tools for acknowledging alarms and noting or scheduling the response. The alarm notification capability was developed largely on the basis of the feedback from Honeywell GSRC.

Feedback from Honeywell GSRC is shown in **Table 3**, at the end of this section. In sum, GSRC personnel feel that the concept is a good one. However, they did not use the monitoring system to help maintain their HVAC units, and in retrospect were not sure if the monitoring system did or did not identify a few HVAC service issues that had to be addressed earlier in the year. Late in 2006, Honeywell GSRC again became interested in the monitoring system and some work was done to get the monitoring system fully working (much of the data transmission from the GSRC to FDSI via the Internet had been disrupted the previous month by changes at Honeywell regarding their Internet firewall).

California Universities

The prototype system was installed at California State University, East Bay, in December 2005, and the training session for CSU East Bay was held in late April 2006. Feedback from the

training session included the comments shown in **Table 3**. Most of the comments centered on the Web site, e.g., requesting more or better information. Following the training session, however, the HVAC technicians' interest in the monitoring system seemed to fade. A concluding observation from CSU East Bay in early 2007 was that the monitored HVAC units were ones providing air conditioning for the skilled trades rooms, and because the doors there were often left open most of the time, the air conditioners were turned off most of the time.

The prototype system was installed at the University of California, San Diego, in February 2006, and a training session was held in early May. Feedback from the training session included the comments shown in **Table 3**. The major topics were requests for capability that was not in the current system, such as the ability to see the raw data, and the ability to troubleshoot problems without going to the unit itself. For three or four months, UCSD personnel did pay attention to the system, but after that interest in it was sporadic, usually only in response to a phone call or email from FDSI. Eventually, UCSD commented that they already monitor their buildings using a Johnson Controls building automation system, and that it would be best if the FDD monitoring could be integrated with the Johnson Controls system, so that they only need to watch one monitoring system. It is also worth noting that the HVAC units chosen for monitoring were new ones, and therefore UCSD technicians may have assumed there would be few problems with the units.

The prototype system was installed at the University of California, Los Angeles, in January 2006. However, because there was no ready interface to the digital thermostat system there, the local UCLA personnel felt that the system would not offer much to them. There was some discussion of how to create an interface to the digital thermostat system, but in the end no training session was ever scheduled. UCLA also commented that the monitoring system would make more sense for them if it were integrated with their Siemens Apogee building automation system.

Overall, the UC San Diego site was the most successful of the three in terms of involvement by the customer. As noted in Table 3, the general assessment from San Diego was that the FDD monitoring system does provide diagnostics that are not available via the existing building automation system there, and they would like to continue their use of the monitoring system. At the same time, they really want to see the raw data when an alarm condition exists, and they would like it integrated with their Johnson Controls building automation system.

Comments from all three universities indicated that the HVAC technicians did not have time to look at a Web site to monitor the condition of their HVAC units (and, at least at two of the locations, they already have to look at their own building automation systems).

Staples

The Sentinel prototype system at Staples has yet to be installed. In this case, FDSI is working with the HVAC service consultant who advises Staples on HVAC matters. There is no opposition to the installation of the FDD monitoring system, but working through the layers of responsibility has contributed to the delay. When established, this installation will provide an opportunity for feedback from a different type of user, namely, the HVAC service consultant.

Table 3. Participant Feedback

Site	Feedback
Honeywell GSRC	Short story, I think the concept is the way to go.
	The system should send an email message with alarm information when an alarm condition occurs.
	On the Web site, alarms need to be categorized and then sorted chronologically, with most recent first.
	The reporting time scale may need to be re-considered, e.g., what about having the ability to escalate alarms within an hour or more rather than within a day or more.
	A user needs the ability to delay, or reschedule, the annunciation of an alarm for an ad hoc variable length of time rather than the fixed time periods in place.
	In general, a further clarification of the objectives of the alarm management system was suggested.
CSU East Bay	The practice of numbering the units RTU-1, RTU-2, and so on, is not helpful. The CSU personnel want to see on the Web site the unit's actual name and location.
	On a heat pump, alarms should be identified as to whether they occurred during cooling mode or heating mode.
	There were some data collection or communication failures, e.g., for one unit the monitoring was not working fully.
	A few of the explanations (on the Web site) of possible causes of alarms were considered to be vague.
	The monitoring system was not used to its potential because the monitored HVAC units service the skilled trades rooms where the doors are open most of the time, and thus the air conditioning was turned off most of the time.
	UC San Diego
Perhaps we need to get smarter on how to make use of the FDD monitoring system.	
The Web site does not show the raw data. The participants felt that the ability to view raw data might boost their faith in the system.	
It would be great to see the raw sensor data for today, then be able to trend it.	
The participants wanted to know at what point the raw data was processed to produce the summary information shown on the Web site.	

Site	Feedback
	<p>As at CSU-East Bay, there was a request to show on the Web site the actual unit names and numbers, rather than the generic nomenclature of RTU-1, RTU-2, etc.</p> <p>Participants said they had hoped this system would give them enough information to troubleshoot problems without going out to the actual unit location.</p> <p>Suggestions for the Web site included adding a list of all the points being monitored, adding a few more alarms to the list of alarms ('no indoor fan operation,' and 'return air temperature sensor problem'), and making it easier to find the reasons for each alarm.</p> <p>We are understaffed and don't really have time to look at a Web site.</p>
UCLA	<p>Our campus buildings are managed by a Siemens Apogee building automation system. Our people are familiar with it, and comfortable with it, and would prefer to use only one system for monitoring buildings here.</p> <p>I don't think your system will tell us anything that we can't get from the Siemens Apogee system.</p> <p>Our HVAC units have digital thermostats. There is no point in looking at your FDD monitoring system until you have an interface to the digital thermostats.</p> <p>The monitoring system does not give us a way to check and calibrate all sensors and transmitter for accuracy, and to maintain all parameters within design specifications.</p> <p>We don't really have the time to check the HVAC units based on the FDD monitoring system, and we are really busy.</p>

Note: A number of the requests listed in Table 3 were answered with appropriate changes over the course of the trial period, e.g., showing on the Web site the actual names of the HVAC units, allowing for the 'delay' period for responding to an alarm to be in hours rather than days, at least a partial implementation of the email alert feature, and showing the current (near real-time) sensor data from the units.

Feedback From Non-Participants

The feedback from trial participants was useful but limited. In order to gather a little more of the “market’s impression,” a short questionnaire was constructed (included in the Appendix) and used to solicit feedback from interested and informed non-participants. A small number of non-participants provided impressions, and they chose to provide written and verbal comments instead of using the questionnaire form. (The non-participants included an HVAC service provider and several industry consultants.)

Because the non-participants had only the Web site to look at and respond to, their comments were primarily about the capability of the Web site, rather than the capabilities of the FDD monitoring equipment. Comments are shown in **Table 4**, organized by the general categories of: target user, Web site usability, and data presented.

In general, the non-participants tended to be more critical of the Web site. This may be due in part to the fact that they may have felt they were being asked to critique the Web site, as well as the fact that it was a conceptual matter and did not concern a real HVAC system that they had responsibility for.

Table 4. Non-Participant Impressions

Target User	No single Web site is going to be able to satisfy the needs of all the intended users listed. The different types of managers are going to want to see different types of information, and the service personnel would have even different demands.
	Although the project was designed to address the needs of different target audiences, maybe now is the time to focus on a selected group of users with similar needs.
	This product really needs to be integrated into a larger facilities management system, or asset management system, or dispatch system.
	Dispatchers are not likely to use a Web site like this.
	The actual service technicians are not likely to use a Web site like this, and most don’t have PCs.
Web Site Usability	Too much scrolling is required. It doesn’t tell me what I want to know right at the top.
	The Web site has a lot of material and it is not always presented the best way, whether graphically or not.
	As it is now, the Web site is a little overwhelming, and not particularly useful.
	It might help to simplify the Web site, with a simpler level at the start. Perhaps some of the details can be hidden unless a user really wants to go to that level of detail.
	It wasn’t immediately obvious how to clear an alarm.
	Units need to have real names, or the locations need to be shown, otherwise users will not readily know which unit is RTU-1, which is RTU-2, etc.

	The plots are not clearly labeled, e.g., to clearly indicate that the plot is the deviation from the goal.
	Nobody is going to have the time to look at the Web site on a regular basis. It all has to be exception reporting, e.g., via emails.
Data Presented	Technical people will want to see the raw data.
	I want to be able to change, say, the superheat goal, since my idea of the goal is not the same as this Web site's idea.
	On the superheat plot, showing deviation from the goal, there were two dramatic downward spikes (toward zero) on one plot. These downward spikes were actually the best days, but the way the plot was presented, they looked like the worst days.
	I want the option to see all the data. E.g., on the superheat plot, I want to see all the numbers that go into the data point.

Conclusions

Most customers of the prototype system seemed to lose interest after an initial period of use, and there are a number of possible explanations. One is that the prototype users may not have been the best customers for this type of system. For example, this type of system might make more sense for customers in an existing facilities monitoring center, rather than for HVAC technicians busy with maintenance work. Another possible explanation is that some of the customers already use a building automation system, and perhaps the FDD monitoring system did not provide information that was both new and important enough to these users to warrant paying attention to a second system. A third possible explanation is that the FDD monitoring system was not complete enough, in that (for most of the trial period) it did not provide the raw data along with the diagnostic summary data. When customers who were no longer actively looking at the system were asked why not, some mentioned features that the system did not have as a reason for not using it, in addition to commenting that they were too busy to look at it. Another factor may have been the HVAC units themselves, for example, at CSU East Bay the units were often turned off, or at UCSD the units were all new and not expected to have problems, or at UCLA the units all had digital thermostat controls that were never integrated with the FDD monitoring system.

Nevertheless, customers did express some opinions, summarized as follows:

- The concept is the way to go. (This was from a participant at a central facilities monitoring center.)
- The system does provide diagnostics that are not available elsewhere, but the value of the system is not clear enough to HVAC maintenance departments. (One participant's comment was, "Maybe we just need to get smarter on how to use the FDD monitoring system.")
- Interfaces are needed to existing systems, such as building automation systems, and digital thermostats on the units.
- It would be very helpful for HVAC technicians to see the raw sensor data for current alarm conditions, and then to be able to trend it. The Web site should list the sensors for each unit, so that the technicians know exactly what is being monitored.
- The problems with the communications links need to be solved. (The communications links between the sensors and the Point Six data collection modules were problematic at some sites. In addition, the link between the installation site and the Web could be a problem, as in the case where a change to the Internet firewall at one location prevented the FDD monitoring data from getting to the Web site.)
- It would be helpful to have email alerts when an alarm is triggered, perhaps depending on which type of alarm. (The email alert feature was not fully implemented during the trial period.)
- Most customers did not use the Web site to acknowledge or respond to alarms, even in cases where they serviced an HVAC unit. (This may have stemmed from several reasons, but it was also not obvious how to respond to or acknowledge an alarm via the Web site.)

-
- The objectives of the alarm-tracking feature should be aligned with customer objectives. (This, of course, can vary depending upon what type of customer is using the system.)
 - The Web site should be re-designed to better present the information, with a more graphically oriented summary of unit status, making some of the detailed information less prominent.
 - Better explanations of the alarms are needed on the Web site.
 - Better explanations of the graphs on the Web site would be helpful.
 - The users of the prototype system during the trial period were basically too busy to look at the Web site.

Appendix – Survey Form



Remote Monitoring of Rooftop HVAC Units Evaluation of Trial System

Field Diagnostic Services, Inc., is interested in your opinion of a system for remote monitoring of rooftop HVAC units, where the data collected is viewed on a Web site. The goals of the system are:

- Communicate status for units and collectively for sites
- Communicate and categorize alarms or faults, indicating economic impact
- Show performance information using performance indices
- Track responses to alarms including the status of repairs
- Provide a method to prioritize repairs

The system is designed for facility managers, energy managers, maintenance managers, HVAC service technicians and technician dispatchers.

You can take a look at the demonstration Web site, for a company called DEMO, at:

<http://vm.acrx.com> (user name = user3, password = usr3pwd)

After logging in, click on **Alarms** or **Sites** to begin viewing information based on data transmitted from some real rooftop units being monitored. (Try RTU-1 under “NY Site.”)

We are interested in your comments and suggestions. The questions on the following page are organized into two groups: (a) how well does the system meet the goals outlined above, and (b) what would you really like to see if you were a user of this system.

If you would like to discuss this, rather than filling in the attached sheet, please contact Richard Veith at FDSI, tel. # (267) 583-6330, ext. 32, or email rveith@fielddiagnostics.com.

Remote Monitoring of Rooftop HVAC Units, Survey

Your name:

Your company:

Your role, position or title:

Date:

Is the STATUS of the HVAC units communicated well?	Not at all 0_ 1_ 2_ 3_ 4_ 5_ Quite well
How important is this feature for you or your company?	Not at all 0_ 1_ 2_ 3_ 4_ 5_ Very much
Are the ALARMS categorized and communicated well?	Not at all 0_ 1_ 2_ 3_ 4_ 5_ Quite well
How important is this feature for you or your company?	Not at all 0_ 1_ 2_ 3_ 4_ 5_ Very much
Is system PERFORMANCE communicated well?	Not at all 0_ 1_ 2_ 3_ 4_ 5_ Quite well
How important is this feature for you or your company?	Not at all 0_ 1_ 2_ 3_ 4_ 5_ Very much
Are alarm RESPONSES tracked well?	Not at all 0_ 1_ 2_ 3_ 4_ 5_ Quite well
How important is this feature for you or your company?	Not at all 0_ 1_ 2_ 3_ 4_ 5_ Very much
How well can you PRIORITIZE REPAIRS?	Not at all 0_ 1_ 2_ 3_ 4_ 5_ Quite well
How important is this feature for you or your company?	Not at all 0_ 1_ 2_ 3_ 4_ 5_ Very much

Is there anything really important that this system should do, but doesn't do now?

What would you suggest that we do differently?

What potential do you see for a system like this (with or without changes)?