Life in a Very Cool Lab

Premise Systems' Dan Quigley used his home as a testing ground for his company's SYS automation software. And the results are in…
By Steven Castle

Pat Quigley doesn't mind living in a laboratory, which may seem unusual for an interior designer. The 6,500-square-foot house she shares with her husband, Dan, and their two teen-agers near Redmond, WA, has become a testing ground for the home automation software written by Dan's company, Premise Systems, recently acquired by Lantronix. The French country-style house still has all the aesthetics that Pat demands. But behind the textural earth tones and natural feel, the house is run by Premise Systems' SYS, a home automation software platform designed to create plug-and-play capability with virtually any electronic device.

And Dan, who is the president of Premise Systems, was the chief integrator responsible for making the extensive lighting, security, audio, video, and heating and ventilation systems work together. The home is, in effect, a network that he's constantly tinkering with.

The idea behind SYS is to allow easier automation programming by automatically loading control drivers for various electronics when they are added to the network or plugged in. This allows systems integrators and serious do-it-yourselfers more time to seamlessly integrate electronic systems to complement people's lifestyles. And Dan figured the perfect testing ground was his family's own house, which was built in 1994 and enlarged by 2,500 square feet in 1998. The addition includes a new family room, a design studio for Pat, enlarged bedrooms for teen-agers Rich, 19, and Katie, 17, a shared bath between them, and a hobby shop.

The integration of all the electronic systems in a home of this size could have been terribly complicated, but in the spirit of SYS, Dan simplified that. "The systems in our home consist of everything that's available off the shelf," he says. "We really didn't do any custom electronics in the house." SYS software is installed on a PC appliance concealed in a utility closet.

Dan boasts that his family's residence is the smartest house in the world—and with 12 audio zones, 14 environmental (HVAC) zones, 16 security zones, more than 100 lighting loads, and 128 occupancy, motion, temperature and moisture sensors inside and out, he has a case. But intelligence is measured only by how well all those systems and sensors work together. "One of the things we've learned is that these kinds of systems can get really complex to use," says Dan. "You have to make it really simple and focus on the person [who's using it] and not the technology."

A Day in the Life
Consider a typical day for Pat, who does not consider herself technologically oriented, yet works out of the house and interacts with its systems throughout the day.

To listen to classical music while working in her large, cathedral-ceiling studio, all she has to do is call up the home's Web page on her computer's Web browser, press "Media," and a list of her favorite artists appears. Everyone in the house has his or her own library of music and customized play lists they can access from anywhere in the home. Audio is streamed from the central server, or in Rich's and Katie's cases, from their own PCs in their bedrooms. With the rate at which Rich and Katie collect digital music files, Dan decided it didn't make much sense to try to cache them centrally.

Any kind of source, be it a CD or an MP3 file, can be played anywhere in the house, and play lists can be created by mixing albums, tracks from CDs, and MP3s. This is done by Premise Systems' new mSense, an intelligent switching technology that automatically determines whether the source is a CD, a DVD, or an MP3 file, and how to play it.

Pat's office is a serene space, its ambiance often warmed by a gas fireplace and illuminated by two skylights. The two motorized skylights in the ceiling close automatically when it starts to rain, a huge convenience in the oft-wet Northwest. The skylights and other systems are tied into SYS and rely on input from a Davis weather station and a full complement of motion and occupancy sensors installed throughout the house.

For example, a sun sensor on the weather station provides SYS with the information it needs to adjust the lighting levels in certain rooms if people are occupying them. This is useful in areas of the home that collect a lot of ambient light, so when it becomes dark outside, lighting will come on in a room that sensors determine someone has walked into.

In the summer, a sprinkler system comes on to water the lawn and plants, but only when moisture sensors and a leaf wetness gauge call for it. If someone starts up the walkway while sprinklers in the area are operating, motion sensors there alert SYS, and those sprinklers automatically shut off.

Pat is alerted whenever someone approaches the home. She can go to any display in the home, such as the in-wall touch panel, the TV or her PDA, and see a picture of the guest captured by security cameras. Dan can also do this from his office miles away by accessing the home system directly from any Web browser. He will sometimes use this access to demo the system at work.

If Pat goes out for an appointment and returns home after dark, sensors in the garage door activate pathway lighting to the door. The sensors also notify the security system that someone is home. When Pat presses a button on her key fob, the house knows it is Pat and the security system is disarmed.

She enters to a lighted hallway, and a newscast for her begins with the three top national stories, three top business stories, and national weather over the whole-house audio system. If she hasn't pressed the button on her key fob, she can hit a welcome home button on a touchpad to bring up the lights in whatever areas she is likely to occupy.

When it's time to make dinner, Pat can summon artists such as U2 or Collective Soul to help her stir some ingredients, just by pressing a button or two on the MicroTouch LCD touch panel near the doorway. Later she might sit in the family room to watch the news on the 36-inch Sony Wega TV concealed in the cabinet to the left of the gas fireplace. The room completely conceals its THX surround-sound system with JBL speakers. The front speakers are stowed in a cabinet above the TV, the subwoofers fire from vents inside the cabinet below, and the four side speakers are flush-mounted into the walls and painted to match. (The rack of audio/video equipment, including a Denon receiver, a Pioneer combination DVD and laserdisc player, and a Sony digital satellite receiver, is concealed in a cabinet in the adjacent music room.)

If the TV cabinet is closed before the TV cools enough, a ventilation fan activates automatically. Similarly, a firewood cabinet to the right of the fireplace has a fan that helps dry the wood if alerted by a humidity sensor there. The firewood cabinet can also be opened from the outside so wood can be stacked there without carrying it through the house—a low-tech form of convenient home automation.

The family room opens via patio doors on two sides to porches, one with a pergola. The intent is to bring nature inside, especially during the wet winter months of the Northwest, when residents don't get much time outside. And if it gets cold, the Quigleys are covered. If motion or occupancy sensors are tripped in the room and the Davis weather station registers an outside temperature below 55 degrees Fahrenheit, the HVAC system goes into automatic mode, heating the room to the desired temperature specified by the in-room thermostat.

Sensors in some areas consider the weight of extra people to adjust the heat accordingly. For example, if several people occupy a single area, the HVAC system may actually decrease the temperature so the room doesn't get stuffy or hot. The weight sensors also prevent the Quigleys' dog or cat from activating the HVAC system in a zone when one of them enters a room.

The family may gather later to watch a movie in the home theater, which also serves as a library. When the audio/video system cues up, the lights automatically dim to a very low level. And if the telephone is answered when someone is watching a movie or listening to audio, the sound automatically mutes, and the lights brighten.

Connected Guests

When Rich and Katie are at their friends', and want to listen to their own music, all they have to do is go to the Quigleys' own password-protected home control Web site, and select a song.

But when people do visit—and they often do—this house is guest-friendly. When entertainment modes are engaged, the fireplaces come on and bathrooms stay lit so lights aren't being constantly switched on and off as people go in and out. The main home control panels also freeze, so guests can't inadvertently affect light, ventilation or music levels.

That doesn't mean Dan can't have fun with guests, or even his own family members. One night while testing the system he came across some digitized sound effects. He was quickly able to program the system so that when motion sensors detected someone entering the kitchen, blood-curdling screams would emanate from the speakers. Sure enough, daughter Katie and a friend entered the dark kitchen at 11 p.m., dropped everything and screamed themselves. Rich, Katie and their friends spent some time thereafter dueling in house-produced horror sounds.

When the day is complete, the Quigleys can settle down for sleep and shut off everything in the house by hitting a good night button on a control panel. If someone happens to get up in the middle of the night, motion sensors trigger a pathway of dim lights to the bathroom. Of course, even the best technology doesn't always work as intended. Sometimes it works too well, as was the case one night when Katie came home. Pat had been consulting on some interior designs with their neighbors from across the street, the Springfields. Jim Springfield is the chief technology officer at Premise Systems, so the Springfields' house has a SYS system as well. To deliver some furniture to the Springfields, Jim's wife gave Pat her garage door opener, which Pat put in her car, only later to be driven by Katie. You can guess what happened next: When Katie returned home, she repeatedly pressed the garage door opener, but the Quigleys' door remained shut. Meanwhile, the Springfields' garage door was opening and closing without any reason and Jim immediately used SYS to turn on all the lights in his home, thinking there might be a burglary. The neighbors can laugh about it, now.

After all, that's life in a lab.

Source: Castle, Steven, "Life in a Very Cool Lab," Electronic House Magazine, May 2002.