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The Siemens Building Automation and Allen Technologies Interactive Patient System (IPS) Solution

How integrating building automation and patient room temperature control drives quality care environments, improves patient satisfaction, and reduces energy costs

White Paper | November 2014

Intro

Hospitals across the globe are continually updating their equipment and services in order to offer superior high-tech medical care, improve patient comfort, and impact productivity through a more efficient work environment.

Located in the heart of Silicon Valley, California, El Camino Hospital has valued the importance of technological advancement since opening in 1961. Explaining its geographical advantage, urologist Dr. Sari Levine said, "Not only did we get a robot to do a lot of the procedures, we get the newest version because the company's down the street."

El Camino Hospital's cutting-edge facility in Mountain View opened to the public in November 2009 and, in 2014 earned the ranking of the most technologically advanced hospital in the world by *Top Master's in Healthcare Administration*. The $470-million facility features robots that carry supplies and pass tools to surgeons, remote robotic surgery capabilities, palm-scanners for patient registration, and infection-resistant bedside computers. El Camino's doctors are empowered to seek out and deploy new treatments and technologies, making the hospital a magnet for some of the best medical minds in the nation. This provides patients with access to medical care that is truly state-of-the-art.

The challenge: controlling costs

Healthcare organizations in the U.S. spend over $6.5 billion on energy each year, and that amount is increasing to meet rising patient satisfaction needs. According to the United States Environmental Protection Agency, hospital CEOs consistently list financial challenges as their number one concern.

Significant savings can be realized by focusing on improving the energy performance of existing equipment. Recalibrating thermostats and occupancy sensors, adjusting operating schedules, and rebalancing the air and water flows of the HVAC system are just a few ways to improve occupant comfort and save energy costs in the near term.

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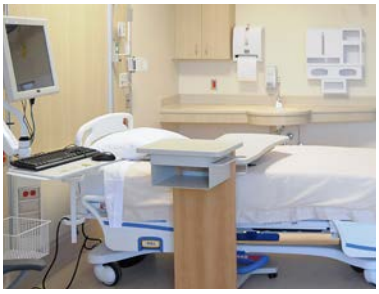
According to the United States Environmental Protection Agency, "Every $1 a non-profit healthcare organization saves on energy is equivalent to generating $20 in new revenues for hospitals or $10 for medical offices. For-profit hospitals, medical offices, and nursing homes can raise their earnings per share a penny by reducing energy costs just 5 percent."[1] Saving energy can help hospitals not only improve their bottom line, but also increase their competitiveness by freeing up money for new technology.

Additionally, patient care has always been at the center of hospitals' concerns and in today's healthcare industry, the patient experience and satisfaction have a direct impact on the top-line. A recent industry survey found that 'Patient Experience and Satisfaction' were rated as the number one priority for hospital executives. Improved patient experiences directly correlate to higher HCAHPS results and lower readmission rates. The challenge for healthcare providers is how to improve patient outcomes while simultaneously reducing the cost of achieving them.

The vision for greater efficiency through integration

Today, El Camino Hospital is celebrating over 50 years of being at the forefront of medical care. And they intend to remain there by not only continuing to introduce cutting-edge medical technology but also by integrating information from all hospital sub-systems – HVAC, energy management, fire safety, air quality, and security – to drive optimal patient satisfaction.

El Camino Hospital executives envisioned patient-centered, two-way media devices in every patient room. This would give every patient the ability to control the room temperature from their bed, without having to call the nursing staff for assistance; however, few proven hospital solutions such as this existed.



Furthermore, like all facilities with disparate systems, hospitals waste energy when HVAC equipment runs at full speed to cool or heat a room that is unoccupied.

[1] http://nepis.epa.gov/Exe/ZyPDF.cgi/P1004NH5.PDF?Dockey=P1004NH5.PDF

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Typically, patient occupancy is lower during the summer and higher in the winter. During summer, when there is a greater demand and higher price for energy, hospitals can benefit by reducing occupancy setbacks and redirecting HVAC to occupied spaces. Integrating and automating the HVAC system creates tighter control in occupied areas and saves energy in unoccupied spaces.

The pioneering solution: improving room temperatures and saving energy

El Camino Hospital selected Allen Technologies to provide an Interactive Patient System (IPS) that patients could use from their bed to access HDTV, browse patient education channels, recieve important hospital information, and control their room temperature. The Allen Technologies IPS, along with the Siemens open protocol APOGEE® Building Automation System (BAS), is an economical, flexible, and scalable solution that meets the needs of today and allows for multi-campus expansion in the future. This also allowed El Camino to create a list of their immediate needs while setting the foundation for "wish list" items down the road.

The IPS integrated easily with the hospital's IT systems via Health Level-7 (HL-7) protocol and without great impact to the internal IT teams workload. In fact, remote, centralized management, maintenance, and support are provided by Allen Technologies.

Two modules were deployed to communicate with the BAS and control temperature setpoints. The first module, the

Climate Control Module (CCM), enables the control of room temperature from bedside. The second module, the patent-pending Intelligent Environment Module (IEM), automates the control of occupied & unoccupied rooms through the BAS.

1. The hospital's Admit Discharge Transfer (ADT) system sends information to the IEM
2. The IEM receives and processes the ADT information to determine occupancy status and sends result to Siemens BAS
3. The BAS automatically adjusts the room settings according to room status: When unoccupied, air flow in the patient room is reduced to minimum code requirement to conserve energy/reduce costs; when occupied, settings are adjusted for optimal patient comfort

Features of the Interactive Patient System at El Camino Hospital

- All 300 patient rooms have a 42" flat screen monitor, networked PC, pillow speaker, and a medical-grade keyboard
- Free TV Free Premium HD and Movies-On-Demand
- Welcome & Hospital information
- Free Internet Access
- IPS integration with EMR/ADT
- Remote IPS monitoring, maintenance, and support by Allen Technologies
- Educational videos assigned and available for patient browsing
- New features are provided to patient, easily and transparently, without adding new hardware

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Siemens engineers implemented new programming and a Sequence of Operations (SOO) for all existing patient rooms and created a front-end graphic to depict unoccupied/occupied spaces.

This integration now provides the hospital's facilities maintenance staff with at-your-fingertips information on room occupancy and patients with the freedom to adjust room temperature, eliminating the need to call in the nursing staff to respond to "hot/cold" calls.

Enhanced patient outcomes

The Siemens and Allen Technologies IPS integrated solution can help hospitals provide better care by automating routine hospital service requests, monitoring patient education requirements, and measuring patient satisfaction. The system frees up caregivers, allowing them to focus on primary patient care, while providing a feedback mechanism that allows hospitals to identify patient satisfaction issues in real time.

Enhanced economic efficiencies

At El Camino Hospital, the reduction in energy costs and time-saving results of the IPS integration solution have been immediate and measurable.

Estimated Annual Savings	
Electricity Energy Savings	**817,794 kWh/yr**
Electricity Cost Savings	**$112,855.58/yr**
Natural Gas Energy Savings	**56,926 Therms/yr**
Natural Gas Cost Savings	**$38,425.17/yr**
TOTAL ENERGY COST SAVINGS	**$151,280.76/yr**

The innovative IPS solution, pioneered by Allen Technologies and Siemens, has improved staff productivity and environmental control while helping to ensure quality of care and reduce utility costs through energy savings.

Highlights

- Heating/cooling plant energy savings estimated at approximately $150,000 per year (boiler gas/electricity for chiller pumps and fans) and prolonged equipment life.
- Reduced time required by staff to fulfill requests to change patient room temperatures, allowing nurses and facilities staff to focus on patient and clinical facility priorities.
- Greater patient comfort and satisfaction by controlling room temperature from their bed; and enhanced safety by minimizing the potential for slip/fall incidents.

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A scalable, customizable, and cost-effective solution

Technologically advanced doesn't have to mean expensive or intrusive. The Allen Technologies Comfort Control Module (CCM) and/or the Intelligent Environment Module (IEM), coupled with the Siemens APOGEE system, works at a wide-range of healthcare facilities. It can be easily tailored to the individual requirements of a hospital, outpatient center, or long-term care facility, and offers the opportunity to fulfill their most immediate interactive patient care needs, while providing a strong foundation to add new functionality in the future.

This managed, cloud-based service can be easily deployed through a hospital's existing equipment – TV only, non-Allen interactive systems, or Allen interactive systems such as the cable television or Admit/Discharge/Transfer (ADT) system.

Option 1: Cable, satellite or over-the-air TV only

In this scenario, hospitals can benefit by deploying the Allen Technologies Intelligent Environment Module (IEM) with Siemens APOGEE to set rooms into occupied or unoccupied modes. This solution DOES NOT require any special interactive system, hardware or pillow-speaker, so hospitals with only TV for their patients can still benefit from having the Siemens and Allen Technologies solution.

Option 2: Through ADT system

Hospital information system sends ADT information to IEM.

- The system is monitored 24/7/365 by Allen Technologies.
- Allen IEM receives and processes ADT information to determine room status and sends the result to the Siemens HVAC System.
- Siemens system automatically adjusts room settings to conserve energy/reduce costs when status is Unoccupied. When status is Occupied, settings can be adjusted by the patient to ensure their optimal comfort.
- Allen IPS collects room temperature information from Siemens system and displays for patient.
- Patient views and makes room temperature adjustment request using Allen Interactive Patient System pillow speaker.
- IPS sends request for temperature change to Siemens system and the adjustment is made automatically.
- Potential to integrate to lighting and window shades.

Option 3: Expanded existing IPS

Hospitals who are already using an interactive patient system other than Allen Technologies can benefit in two ways from implementing the Siemens/Allen Technologies solution:

- First, hospitals can benefit by deploying the Intelligent Environment Module to set rooms into an occupied or unoccupied state via Siemens APOGEE.
- Another way hospitals can benefit is by deploying the CCM via the existing interactive system so that patients can view and control room temperature from their bed.

How the IPS works in Occupied Mode – When a patient is admitted:

- Upon patient admission, the APOGEE BAS automatically releases the reheat valve and VAV flow controller to modulate air flow
- Room Temperature setpoint becomes 72°F
- A nurse, patient or guest can adjust the room temperature at any time using the wall-mounted room thermostat
- With the IPS, a patient can adjust room temperature by selecting "Adjust Your Room Temperature"
- Patient Adjusts setpoint and the setpoint on the BAS changes to match the new request
- Parameters can be set to allow a low and high limit of setpoints

How the IPS works in Unoccupied Mode – When a patient is discharged:

- Siemens APOGEE BAS integrates with the ADT system using the patent-pending Intelligent Environment Interface from Allen Technologies
- Upon discharge of the patient, the BAS will automatically reduce air flow in the patient room to minimum design while retaining the code required for "air balance and air changes"
- The reheat coil valve that ventilates/supplies air to the patient room is closed. This sequence is the most economical setting for this type of HVAC system

Benefits of an IPS

- Leads to optimization and energy savings
- Prepares the room to be ready when patients arrive for the first time
- Generates fast payback depending on hospital occupancy rate and geographical location
- Enhance patient satisfaction by creating the options to control room temperature, lighting, blinds/shading from the safety of their bed
- Creates a proactive rather than reactive system; helps identify outliers for maintenance
- Reduces clinical staff costs by reducing requests from patients to adjust room temperature
- Helps preserve and prolong equipment life by redirecting HVAC needs to occupied spaces and reducing the demand for air volume, AHUs, VFDs, heating and chilled water
- Minimizes likelihood of patient falls due to elimination of need for patient to leave bed
- Reduces need for Nurses and Engineers to respond to hot/cold calls
- Highlights preventative maintenance opportunities for Engineers by identifying rooms experiencing consistent temperature issues and when they are unoccupied on the BMS system

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About Allen Technologies

As a pioneer of interactive patient solutions, Allen Technologies has been transforming hospital TVs into state-of-the-art communication and education portals for more than three decades. Since the installation of the industry's first interactive hospital TV by Allen Technologies in the 1980s, we continue to invest in research and development to ensure that we are bringing the latest, relevant technological advancements to our customers. Our mission is to develop and deliver exceptional interactive patient education and entertainment solutions at the point-of-care that address the key challenges faced by hospitals today.

About Siemens Building Technologies

From engineering specialized solutions for your critical environments, such as isolation and operating rooms, to meeting standards and codes for compliance with the Joint Commission and NFPA, the Building Technologies Division of Siemens Industry, Inc. offers a comprehensive portfolio of healthcare solutions that can be tailored to meet your needs today, while positioning you to grow and address tomorrow's challenges. Our innovative, cost-effective Sustainable Healthcare Solutions place equal emphasis on developing solutions and services to help improve patient outcomes while simultaneously reducing the cost of achieving them. Implemented and supported by a Siemens office near you, we are dedicated to keeping your patients and staff comfortable and your facility in compliance and operating at optimal efficiency.

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