

Raytheon Company

2014 TEEA Winner: Technical/Technology



For Raytheon, a defense and aerospace industry leader, thermal testing of its products across a wide range of environmental conditions is critical to ensuring proper performance in the field. However, at Raytheon's McKinney site in North Texas, the 50 environmental test chambers used to perform these tasks were also one of the largest consumers of electricity. To cool the system, a typical chamber employs two 30 horsepower compressors, which are designed to be able to bring temperatures down very rapidly. Once the desired temperature is reached, however, the system continues to run at full power by creating a false load on the compressor through a bypass loop.

To address this high demand on electricity, Raytheon developed and implemented a mini-chiller system with a programmable controller. The new controller replaces the existing chamber controller and integrates the mini-chiller into the refrigeration package as needed for required temperature conditions. During large temperature changes the primary compressors run and, once the target temperature is reached, the mini-chiller takes over to maintain the temperature. Because this small system only uses one or two 6 hp compressors instead of the two 25 to 30 hp compressors on the standard chamber, it can reduce chamber energy consumption by as much as 90 percent.

The mini-chillers were installed in 2010 and had a notable impact on the site's energy usage. Though results may vary, Raytheon has reduced energy usage by 3,600 megawatt hours annually, or roughly what it would take to power 330 homes for a year.

By reviewing its processes and energy demand, Raytheon found an issue and created an innovative technology to solve it. By reducing energy demand, Raytheon is helping to both conserve water and prevent air emissions.