



SIEMENS

National Naval Aviation Museum

Pensacola, Florida – the National Naval Aviation Museum (NNAM) is the world's largest Naval Aviation Museum and one of the most-visited museums in the state of Florida. NNAM displays more than 150 restored aircraft from the Navy, Marines, and Coast Guard Aviation in its 350,000 square foot space.

In order to achieve the energy reduction requirements mandated by the Energy Independence Security Act of 2007, as well as Executive Order 13423, NNAM partnered with Siemens Industry, Inc., and Pensacola Energy, the city-owned gas utility for a Utility Energy Service Contract (UESC).

Client Objectives

Primarily concerned with achieving energy reduction targets now mandated for federal facilities, as well as facilitating required infrastructure improvements, Siemens completed a survey of the museum to identify opportunities to reduce energy consumption. Key areas for facility improvements were identified, including:

- Rooftop air handling unit replacements (RTU)
- Chilled water system upgrades and optimization
- Energy-efficient lighting upgrades
- Water conservation upgrades

A UESC with Pensacola Energy was awarded to Siemens to fund the important HVAC projects for NNAM.

Siemens Solutions

Under the terms of the Utility Energy Service Contract, Siemens replaced 19 very large RTUs. NNAM received new stainless steel paneled RTUs, along with automatic control dampers, variable frequency drives (VFDs), UV lights, and required testing and balancing for each. New control dampers were installed so that CO₂-based Demand Controlled Ventilation could be implemented. In addition, an energy management and control system (EMCS) upgrade was included with this portion of the project.

Chilled Water System Upgrade and Optimization

Siemens completed several equipment upgrades and replacements within NNAM's central chilled water system, including the replacement and upsizing of three chillers and one cooling tower. In conjunction with these upgrades, Siemens Demand Flow[®] was implemented within the plant. This unique, proven chiller optimization strategy reduces energy consumption and costs, attains additional chiller capacity, enhances building and occupant comfort, and extends equipment life.

Demand Flow offers a holistic approach for optimizing an entire chilled water system, thus increasing the deliverable tonnage of the chilled water plant and requiring less energy to deliver chilled water. For NNAM's Demand Flow implementation, Siemens:

- Converted the primary-secondary chilled water system to variable primary flow
- Reconfigured chilled water piping to eliminate secondary chilled water pumps
- Installed VFDs on all chilled water and condenser water pumps, as well as on all three cooling tower fans
- Installed flow and BTU meters to integrate with the upgraded EMCS

Demand Flow not only decreases total pumping energy, it also decreases chiller energy usage due to an increased refrigeration effect and reduced lift in the chiller throughout the entire tonnage range. With Demand Flow, Siemens can provide colder deliverable chilled water to NNAM's AHU coils while reducing total system energy consumption. This

colder deliverable chilled water in VAV systems can reduce AHU fan energy by reaching set point quicker with colder water and potentially cooler discharge air temperatures. In addition to energy savings, the colder available chilled water creates greater building and occupant comfort and more effective humidity control. Although Siemens has implemented Demand Flow in more than 170 locations across the U.S., this is the first implementation for the Navy.

Customer Results

In the first year following implementation, the energy conservation measures combined to reduce NNAM's energy consumption by approximately 30%, which resulted in utility cost savings of nearly \$511,000. The VFDs installed on RTUs, time of day scheduling, and the Demand Flow solution were the primary contributors for these savings. Year 1 savings break down as follows:

Savings Area	Cost Savings (\$)	Energy Savings (MWh)
Museum RTU replacement	\$259,000	2,342
Chilled water system optimization	\$252,000	2,266
Total	\$511,000	4,608

NNAM will use the cost savings generated by the project with Siemens to help support the National Flight Academy (NFA), which has been built on the same site as the museum. The Academy provides Science, Technology, Engineering, and Math (STEM) programs for students, including programs in aerodynamics, navigation, communications, and flight physiology. Because of the chilled water system optimization project, the National Flight Academy can rely on the newly optimized central chilled water plant, rather than the air-cooled plant originally designed for the project. This change saved installation cost, increased reliability and energy savings and eliminated plant maintenance costs at the Flight Academy, allowing NFA personnel to spend more time on what they do best – training young people for a bright future in science and technology!



Siemens Industry, Inc.
Building Technologies Division
1000 Deerfield Parkway
Buffalo Grove, IL 60089

(847) 215-1000

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