

AT A GLANCE

University of New Hampshire
Durham, NH

PROJECT

Data center design and
construction administration

RESULTS

On time, on budget project
estimated to save the UNH
527,000 kWh per year.

*“Leading Edge Design
presented and executed a
plan that exceeded my
expectations delivering a
reliable, energy efficient data
center with nearly 40% more
floor space.”*

— Patrick Messer,
Director, Research
Computing & Instrumentation
University of New
Hampshire



LEADING EDGE DESIGN GROUP

The Design and Renovation of the University of New Hampshire Research Computing & Instrumentation Center

Background

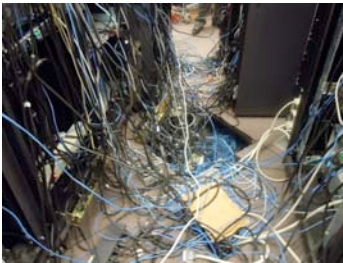
The University of New Hampshire (UNH) Research Computing and Instrumentation Center (RCI) was established to provide comprehensive Information Technology and Instrumentation services in support of the UNH research mission. Launched in Fall 2010, the new center combined the Research Computing Center (RCC), the University Instrumentation Center (UIC) and Research Information Technology (RIT). The University of New Hampshire Research Computing and Instrumentation Center will also serve as an alternative to the outsourcing of non-research information technology needs and fosters collaboration among higher education, industry, and government to create innovative technologies to address important social, environmental, and economic needs.

With 20 full time staff members, RCI serves the UNH research faculty, investigators, administrative offices, academic and administrative departments, external businesses, government agencies, and the UNH faculty, staff, and students. The team provides research computing development services and data management and support. Their areas of expertise include Geographical Information Systems (GIS), scientific and mathematical programming, database administration, system and network administration, data security, and technical support. In addition, they provide state-of-the-art instrumentation services as well as instrument repair and calibration for nuclear magnetic resonance and electron microscopy.

The UNH Research Computing and Instrumentation Center, in partnership with the National Oceanic and Atmospheric Administration (NOAA), was recently honored as a finalist for the prestigious Samuel J. Heyman Service to America Medal for their collaborative work the Environmental Response Management Application, or ERMA[®], that was essential in coordinating the response to the 2010 Deepwater Horizon oil spill.

Once the departments and facilities were merged, the next step for UNH was to create a next-generation research computing facility and data center that would dramatically increase reliability and energy efficiency while improving the University’s ability to support the high density requirements needed for today’s computing research projects. UNH chose Leading Edge Design Group to design the new center and lead the construction administration efforts.

BEFORE RENOVATION BEGINS



Watch a [quick video](#) of the renovation project from start to finish!



Challenge

The University of New Hampshire Research Computing and Instrumentation data center was highly inefficient, and it was not originally designed to meet the university's new and progressive sustainability goals. This is a common problem in data center infrastructures across the globe and throughout most knowledge-intensive industries.

The UNH RCI team faced several challenges with their antiquated and failing power and cooling infrastructure. The existing computer room air conditioners (CRAC) were at the end of their expected useful life and were no longer supported by the manufacturer. Cooling redundancy did not exist causing an entire IT system shut down if one unit failed and the current cooling infrastructure could not support the rack density requirements of today's high performance computing system. In addition, the uninterruptible power supply (UPS) systems were outdated and starting to fail, creating significant reliability concerns.

Moreover, the data center room was entirely occupied, and it did not have the expansion space to add new systems, racks, and equipment. The existing raised floor was carpeted causing issues with static electricity and dust protection.

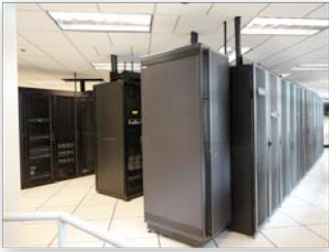
Several proposals were supplied to the UNH RCI team consisting of upgrades that required multi-million dollar investments and a complete systems shutdown during construction – a course of action the university could not consider.

Solution

Leading Edge Design Group met with the University of New Hampshire Research Computing and Instrumentation team and proposed a new design and renovation plan that was innovative yet cost-effective, and created minimal or no computing downtime. The design phase of the project was completed in the first half of 2011. This strategy allowed the UNH RCI team prepare for a summer renovation and implementation when the University's computing requirements are at their lowest demand levels.

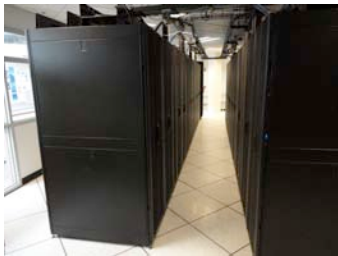
LEDG proposed and implemented a POD-based approach for the UNH RCI. Each pod has its own UPS power, cooling, and telecommunications. The POD approach and a new rack layout optimized airflow management and maximized the available space in the RCI, which created substantial room for expansion. Each POD includes a modular UPS system with overhead power distribution to the racks allowing RCI to adapt quickly to new research and instrumentation projects and their correlating system requirements.

More...



The Pods also utilize In Row Cooling in an N+1 redundant configuration increasing both reliability and the ability of the RCI to support high-density racks. With the updated configuration, the RCI has the agility to quickly and predictably respond to new high performance computing projects.

New flooring was implemented to eliminate static electricity and dust issues. It also created a cleaner and brighter work environment for the RCI staff.



By optimizing the airflow, leveraging a chilled water infrastructure with water-side economization (“free cooling”) and implementing variable-speed in-row cooling units, LEDG significantly improved the UNH RCI’s energy efficiency and will save the university an estimated **525,000kWh** per year.

“For over four years it was clear to me that our 25 year old data center was in dire needs of renovations. Leading Edge Design Group presented and subsequently executed a plan that exceeded my expectations delivering a reliable, energy efficient data center with nearly 40% more floor space. The added challenge of our project was the need to keep production systems available during the renovation. Todd approached this request with an open mind and devised a creative solution which worked without incident. LEDG was the right choice for this project and I am confident that they will be the right choice for our next project on schedule for later this fall.”

—Patrick Messer, Director
Research Computing & Instrumentation, UNH



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About

Leading Edge Design Group is a leading national provider of energy optimization services that delivers significant energy savings to the public and private marketplaces through efficient data center designs and emerging LED lighting and wireless lighting control technologies. Founded in 2007 with the goal of pursuing, promoting, and providing the finest energy optimization solutions available, we help our customers minimize the environmental impact of their businesses while improving operational reliability and reducing costs. Leading Edge Design Group is dedicated to encouraging, challenging, and contributing to energy industry innovation with an ongoing commitment to our community and our environment. Visit us at www.ledesigngroup.com and connect with us on Twitter @ledesigngroup.