PROJECT PROFILE

PUBLIC WORKS


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# LOWELL OBSERVATORY MARLEY FOUNDATION ASTRONOMY DISCOVERY CENTER

FLAGSTAFF, AZ

## APPLICATION:

Nestled in the heart of Flagstaff, AZ, is the newest addition to Lowell Observatory, the Astronomy Discovery Center. Interactive sensory exhibits and even a rooftop planetarium immerse and educate over 100,000 visitors each year throughout three stories and 40,000 sqft.

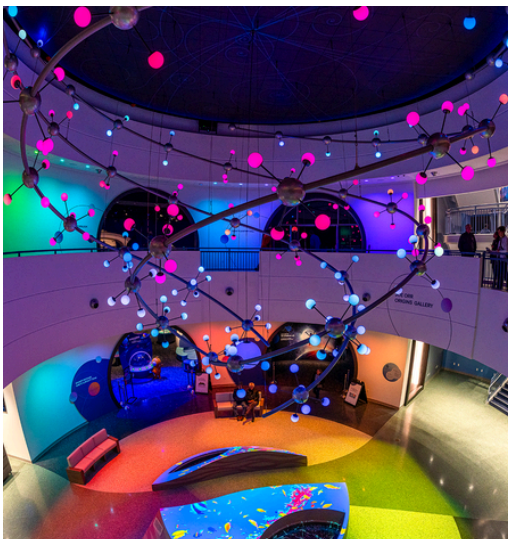
## PROJECT TEAM:

**Architect:** JWA Architects
**General Contractor:** Building & Engineering Contractors Southwest
**Mechanical Contractor:** IMCOR

## DESIGN & PRODUCT SOLUTIONS

Carrying forward more than a century of celestial discovery, the new Astronomy Discovery Center at Lowell Observatory is a powerful testament to education, community, and wonder. As one of the oldest observatories in the country, Lowell has long been a cornerstone of Flagstaff's identity and this 40,000-square-foot, three-story addition strengthens its role as a destination for science education and public outreach. Topped by an open-sky rooftop planetarium and filled with interactive exhibits, sensory learning zones, and immersive technology, the Astronomy Discovery Center opens the universe to students, families, and stargazers of all ages from around the world.

Looking outward, Flagstaff's dynamic mountain town climate, with snowy winters and mild summers, created a challenging environment for HVAC design. From inside the building, where interactive exhibits and a theater with towering screens await the public, each space demanded tailored climate control – not just for comfort, but for the preservation and operation of delicate systems and sensory elements.

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**Delivering Integrated Mechanical & Controls Solutions**
To meet these complex needs and ensure seamless coordination, Varitec delivered a packaged solution encompassing both mechanical equipment and building controls.

Controls were installed in house with the installation of the HVAC equipment by our partner IMCOR. The project was completed with a strict deadline of October 2024 to ensure the opening ceremony the following month was a success. By coordinating with each other and with IMCOR, this milestone was achieved.

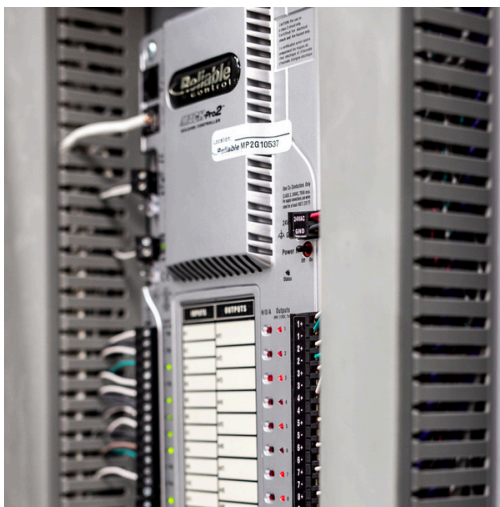
Serving the diverse spaces across Lowell Observatory's newest expansion, the HVAC system was thoughtfully engineered to match both the complexity and creativity of the facility's programming. Two Daikin Rebel Applied Rooftop Units, each delivering 14,000 CFM, condition the air for the Origins Gallery, two large exhibit halls, offices, classrooms, and other spaces spanning the first, second, and third floors.

Equipped with dual-circuit variable speed compressors, ECM fan arrays on both supply and return, high-efficiency MERV 14 filtration, and airflow measuring stations, these Rebels ensure precise environmental control in high-traffic, mission-driven zones.

Throughout the project, Krueger air devices deliver airflow with both form and function. A standout feature is found in the Origins Gallery, where Krueger's RPN diffusers with Punkah nozzles offer a sleek, directional solution that complements the architectural intent while enhancing occupant comfort.

**A Design for a Versatile, Multi-Use Facility**
Our team integrated and managed the building's mechanical systems to provide a truly open serviceable system with Niagara N4 and Reliable controls while refreshing the interface and graphics with Niagara Mods Reflow.

Working closely with the facilities team, we implemented tailored strategies that ranged from locking out exposed thermostats in high traffic areas, to coordinating snow melt system sequences.



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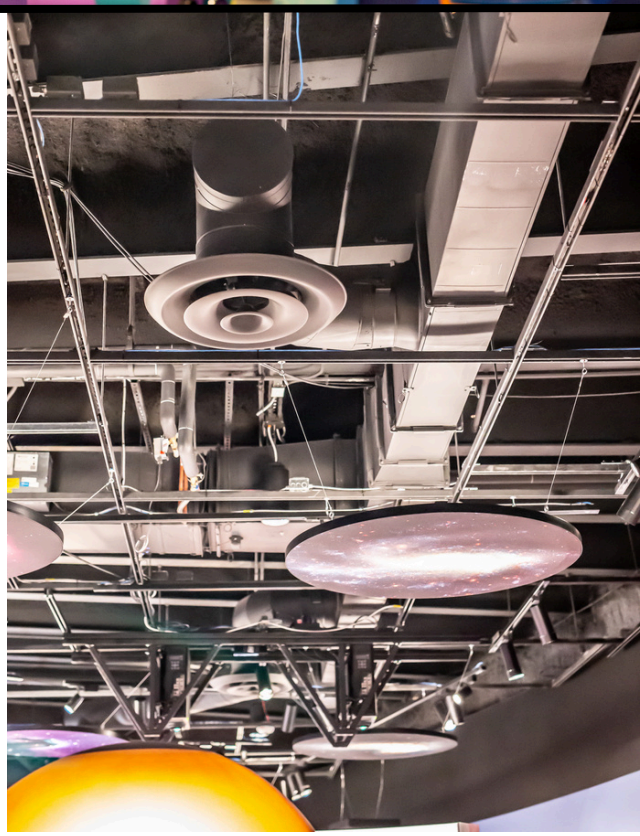
Even aesthetic considerations were engineered with care. The facility's tall, open ceilings allow for planets to hang suspended in the air, evoking a feeling of floating through space. As Facilities Manager Michael Finney noted,

***"I like how the pipes and equipment are exposed in the ceiling. It feels like a spaceship."***

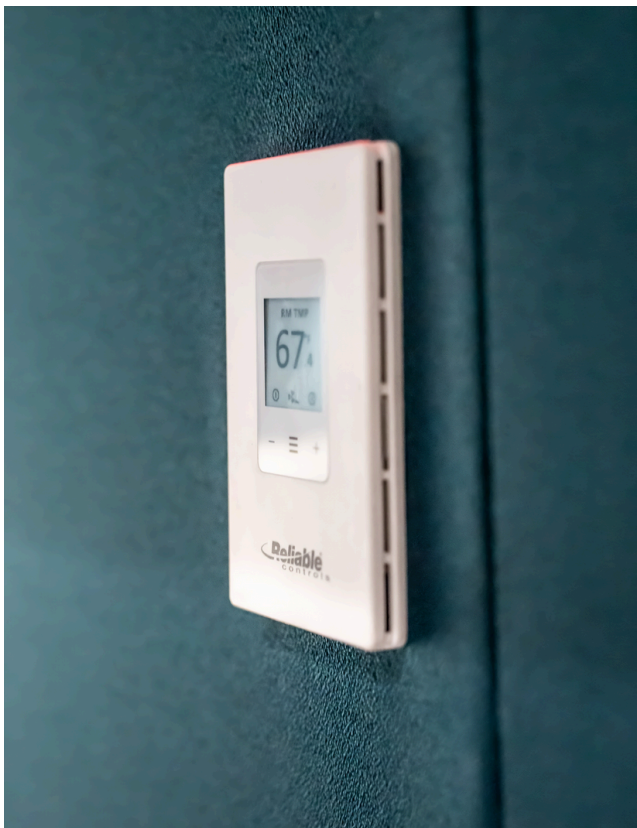
Despite concerns about airflow interfering with hanging structures, the building's HVAC design and carefully chosen equipment have proven stable and efficient, with no impact on suspended elements thanks to the collaboration and innovative minds on the engineering and Varitec teams.



**Engineering for Immersive Spaces**

The Astronomy Discovery Center is filled with distinct and demanding spaces alike from bottom to top. You're immediately greeted with interactive exhibit halls featuring slides, sensory touch zones, and immersive installations incorporating smell, airflow, and sound, that all require careful zoning and responsive HVAC controls to ensure the delicate equipment maintains its function as to educate the masses.

Another cornerstone of the building is the Universe Theater with an immersive, two story, 160-degree LED screen that required precise heat load calculations and high-capacity airflow to maintain occupant comfort during packed events. When walking behind the screen on the cat walks, the warmth radiating immediately becomes apparent. This massive feature of the space is supported by five Daikin mini splits dedicated to cooling the AV system behind the scenes.

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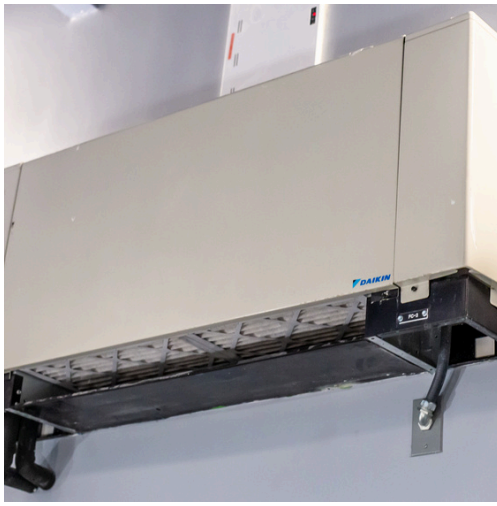
Elsewhere in the building, two large Daikin Vision Indoor Air Handling Units paired with RCS condensing units serve the comfort cooling of the Upper Universe Theater, Gallery 1, and the expansive Great Planetary Hall. These units include airside economizers, ECM fan arrays, MERV 14 filters, and DX coils with AHU-1 also featuring a hot water coil to meet additional heating loads.



Additional Daikin mini splits cool the building's IDF rooms, while vertical fan coil units provide comfort in stairwells. Krueger VAV boxes with Griswold Quickset Piping Packages support variable air delivery across zones, and Ruskin fire/smoke and control dampers ensure code-compliant safety and control.

One more particularly unique feature is a rooftop planetarium fully exposed to the elements, which presented various challenges, particularly during the snowy winter months. In response, our team worked with the design engineer to incorporate a snow melt system that ties into the boiler, controlled via the building automation system, to maintain safe pathways for rooftop guests even after long, icy nights. Although not a typical system for Arizona companies, the system was a success.

Bringing it all together, this integrated mechanical system was supplied almost entirely by Varitec, pairing equipment and controls under one roof to deliver a seamless, no-scope-gap solution for the owner and operations team. Undoubtedly, the Astronomy Discovery Center at Lowell Observatory is a dynamic and inspiring space that we are proud to be a part of.


*Our building presented some unique challenges, including unconventional architectural spaces and a snow melt system. The VCSS team approached these with care and attention to detail.*

*They were highly responsive throughout construction and commissioning, taking the time to understand our operational needs and tailor the controls system accordingly. As a result, we now have an intuitive system that effectively supports our critical facility operations.*

Michael Finney | Lowell Facilities Director

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