Case Study:

Expanding Research Outdoors with Robust Walk-In Grow Rooms

A&L Biologicals addresses outdoor growth chamber challenges with a custom walk-in chamber.

mineARC SYSTEMS

Meeting Research Requirements with Space Limitations

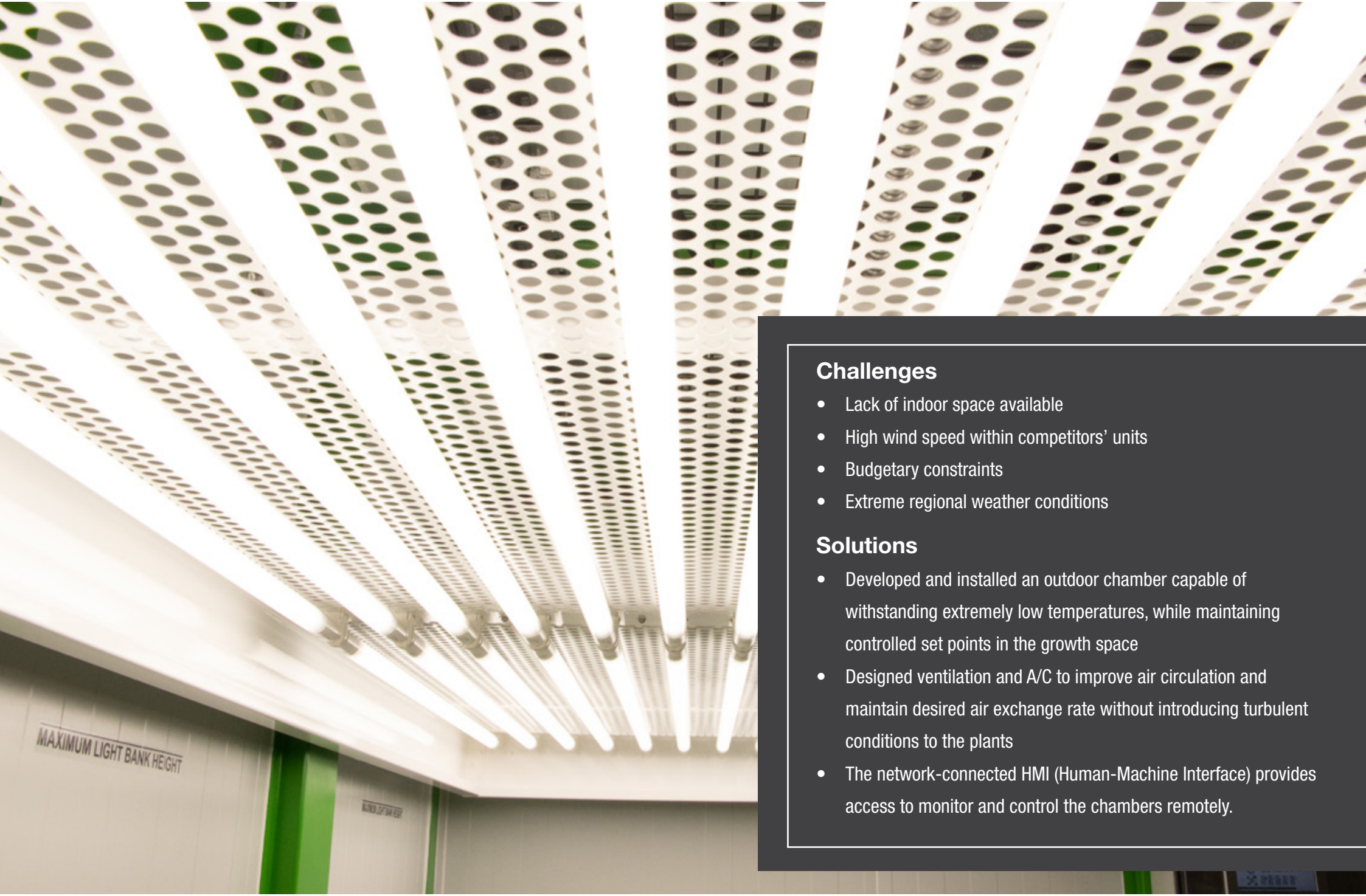
A&L Biologicals' limited indoor laboratory space was going to push its plant growth and research projects outdoors. Expanding research capabilities meant A&L were looking to maintain repeatable growing conditions. Reproducing these conditions is a challenge in a traditional glasshouse, as is the high cost of building an extension to their current space or putting up another building. An outdoor growth chamber was determined to be the best option.

Another significant challenge would be maintaining environmental conditions inside the growth space in the extreme Northern Canadian winters. This requirement led to a collaboration with MineARC Systems' Biora to develop a 390sq/ft custom growth chamber that could withstand the external climate and mitigate the freezing ambient air entering.

A&L Biologicals' Agroecology Research Service Center serves as a research facility dedicated to the detection of microorganisms that affect agricultural production. With plant root health as its primary objective, A&L Biologicals seeks to provide clients with research and innovative technology that increases plant production while also reducing costs. Through their research, A&L aims to develop molecular diagnostic tools that allow growers to understand the pathogens affecting their crops and how to create solutions.

Based in Ontario, Canada, A&L Biological has experienced significant challenges during its continued facility expansion in part due to the cold Canadian climate and its effects on plant growth. MineARC Systems' Biora has worked alongside A&L to provide solutions to the challenges presented.

Pictured: Plant growth testing within Biora at A&L Biologicals



Challenges

- Lack of indoor space available
- High wind speed within competitors' units
- Budgetary constraints
- Extreme regional weather conditions

Solutions

- Developed and installed an outdoor chamber capable of withstanding extremely low temperatures, while maintaining controlled set points in the growth space
- Designed ventilation and A/C to improve air circulation and maintain desired air exchange rate without introducing turbulent conditions to the plants
- The network-connected HMI (Human-Machine Interface) provides access to monitor and control the chambers remotely.

01.

Developed and installed an outdoor chamber capable of withstanding cold winters

Sensitive chamber components vital to maintaining a stable internal environment also had to be able to withstand the extreme temperature fluctuations of the Canadian climate. As the temperature changes throughout the year, the chamber had to be able to adjust to the temperatures of their designated location.

The chamber is equipped with insulated panels to minimize heat transfer with the environment. The chamber design requires fresh air exchange up to 10 ACH (air changes per hour), which would expose the controlled environment to the often-harsh external climate. This potentially significant temperature/humidity difference is mitigated by utilizing Energy Recovery Ventilation (ERV), which uses the expelled internal air to pre-condition incoming fresh air, ultimately reducing the overall load on the air conditioning system. Lastly, heated floors were incorporated to supplement radiant heat to the room to further stabilize the temperatures within the chamber.

Pictured: External view of the portable walk in grow room

MineARC provided A&L Biologicals with a custom approach to air handling to reduce internal airspeed and improve air circulation in the unit without sacrificing fresh air exchange.

Included was a custom-sized energy recovery system to reduce and modulate airspeed and specifically designed air exchanger to maintain ideal gas exchange in a large space.

Casual monitoring or changing of set conditions inside the growth space would have been relatively inconvenient if users had to walk through freezing temperatures to access the controller within the chamber. With remote access available from their office desktop, it was merely a matter of logging onto the remote program to view or download condition data, check alarms or make changes to conditions inside.

02.

Designed ventilation and A/C to improve air circulation and maintain desired air exchange rate without introducing turbulent conditions to the plants.

03.

A controller provides remote access to monitor and control the chambers remotely.

MineARC's focus on the local ambient climate, environmental conditions to be maintained, and the budgetary constraints expressed by the client played a vital role in the success of the project. After a year using the Biora growth chamber, A&L Biologicals plans to purchase two additional units to continue the expansion of their plant growth facilities.

"As Director of Research at A&L Biologicals I and my staff are extremely pleased at the efficiency and the value of the Biora Growth Chamber. It has excellent temperature and air handling properties and the plants thrive in the environment that chamber offers them. It is very utilitarian, easy to keep clean; water is available inside and it has performed well under even the coldest temperatures we experienced this winter." - George Lazarovits, Research Director, A&L Biologicals

Pictured: Internal HMI console to review and adjust internal conditions

Tailored Industry Solutions

Controlled Environment Chamber

- Biora Portable Walk-In Grow Chambers

Life-Supporting Technology

- Robust, insulated exterior
- HMI Controller
- HVAC System
- Fresh Air Exchange up to 10 ACH
- Custom Energy Recovery Ventilation (ERV)
- Heated floors

Training & Education

- Training and operation materials
- On-site operational training
- On-site certified servicing

For More Information

To learn more about how Biora can support your research, visit minearc.com

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