



Innovia GeoTech

AT A GLANCE

TECHNOLOGY	DC Power distribution and PoE, Industrial data acquisition and controls (dry contact and 0-10V analog outputs, and digital and analog inputs), Digital Twin Software, Cloud BACnet based automation system, Wireless RF mesh network for IoT devices
CONNECTED DEVICES	Versatec Ground source heat pump, Belimo Actuated fluid valves, Grundfos Magna Variable flow pumps, Belimo Flow meters, OMEGA Thermistors and thermistor strings (temperature sensors)
PRODUCTS	SpacrNode, SpacrApp, SpacrBAS
CLIENT	Innovia GeoTech in partnership with Ryerson University
LOCATION	Waterloo North Hydro Building: Eby Rush Transformer Station, Waterloo, Ontario
DEPLOYED IN	January 2021
SAVINGS SUMMARY	CapEx: roughly 50%, OpEx: roughly 15%



About the Client

Innovia GeoTech is electrifying thermal energy; they're on a mission to reduce the need to burn fuel for heating and cooling. Not only does this increase a building's sustainability, and reduce operating costs, it also supports the development of a sustainable world.

- Innovia GeoTech is an innovative geothermal heating and cooling company that implements eco-friendly systems into new and existing infrastructure in Toronto and Southern Ontario.
- Their heating and cooling systems produce zero greenhouse gas emissions and protect the soil and ecological systems in place.
- Innovia GeoTech's client, Waterloo North Hydro, needed to optimize their HVAC system for their Eby Rush Transformer Station. That's where Argentum came in.

Andrew Lee, the President of Innovia GeoTech, had this to say about Innovia's experience with Argentum:

"The team at Argentum has been great to work with and have been quick to respond to our questions. We've been using the Spacr product and interface for over 6-months now and have been happy with the flexibility and control it's enabled us to operate our system." - Andrew Lee, President, Innovia GEO Corp.



The Challenge

The major goal of Argentum's project with Innovia GeoTech was to integrate complete control over their client's geothermal HVAC system, and data collected through sensors into a single cloud platform. This would be done with the goal of optimizing the energy efficiency of Waterloo North Hydro's new ground source (geothermal) heat pump system. In short, Innovia GeoTech partnered with Argentum to implement a monitoring and control system for their client's equipment.

The project guidelines were as follows:

- Have the ability to be remotely monitored and controlled on one cloud-based platform
- Integrate HVAC equipment, such as the ground source heat pump, with cloud controls
- Remotely communicate with BACnet devices
- Integrate various sensors to automate the operation of the geothermal system
- Have the ability to remotely calculate and optimize the COP (coefficient of performance)

This was a particularly interesting project because geothermal systems have great potential to "electrify" heating and cooling systems in buildings, which broadens the scope of potential energy efficient solutions in buildings.

The Solution

After analyzing the key problems, we determined that Argentum's IoT solution (including BACnet cloud control, sensors, and the SpacrApp) would be the key to achieving Innovia GeoTech's goals.

Argentum's system is inherently compatible with BACnet, and automatically fulfills this component of the client's request. As a solution to their other major challenge (that they could have complete control of the system through the cloud), we implemented SpacrApp and SpacrSense.

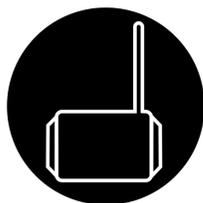
Specifically, the technology and Argentum products we deployed were:



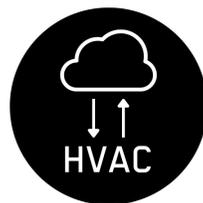
Digital Twin Software



Wireless Sensors



Wireless Mesh Network



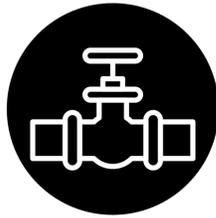
Cloud Controlled HVAC

The complete solution provided to Innovia GeoTech, allows for cloud-based control over all components of the geothermal system, as well as gathers sensor data and insights into a single, unified platform. The platform, SpacrApp, includes an interactive digital twin, which is what allows this data to be intuitively accessed, understood, and used to optimize equipment.

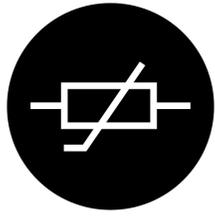
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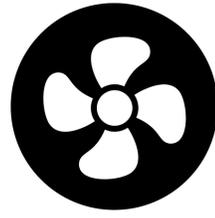
Heat Pump



Fluid Valves



Thermistors



Variable Speed HVAC

By integrating these devices and systems with various wireless sensors (including IEQ and IAQ sensors), SpacrBAS (enables control of BACnet systems), and our digital twin software (available on SpacrApp), we enabled Innovia GeoTech's client to monitor, control and automate their HVAC and geothermal systems based on real-time sensor data. Ultimately, this allows the Eby Rush Transformer Station to optimize energy consumption, as well as equipment performance.

The Results



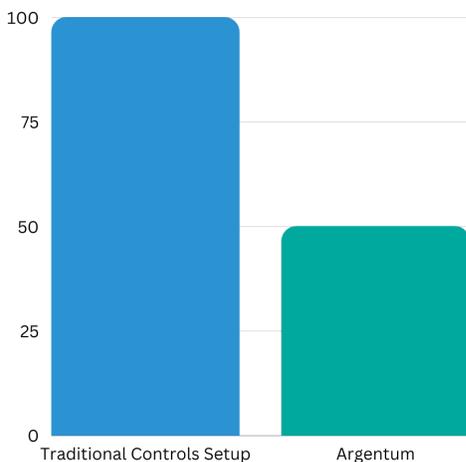
The Argentum system essentially took various pieces of low-cost HVAC equipment that are not natively intelligent, and turned them into “smart devices”.



Argentum improved the uptime of Design Fusion's printers, enabling their facility to be more productive.

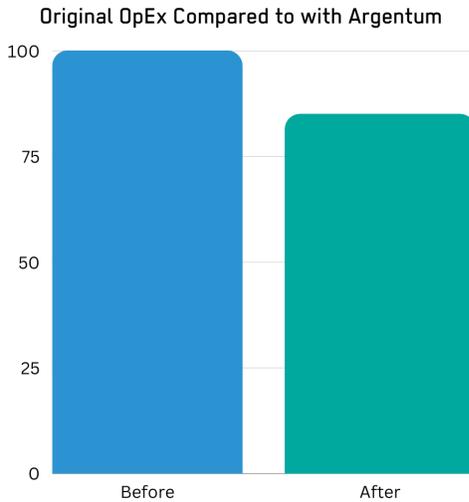
Financial Results

Total Cost of Alternative Compared to Argentum



50% Capital Expenditure Savings

- If they had had a traditional controls setup they would have had to provide power and controls separately for each component of the geothermal system.
- In our unique DC power distribution system, controls and power are managed by a single device (SpacrNode).



15% Savings on Operational Costs

- Versus traditional power for valves and actuators.
- Statistic from Argentum's data collection software.

All in all, now Innovia GeoTech can monitor and control their heat pumps, valves and more from one, cloud-based, intuitive platform that uses digital twin technology. Since Argentum implemented this system, Innovia GeoTech has been able to save on operational costs, reduce emissions, and understand their systems and devices better with insights gleaned from sensor data.