



Automation Software Streamlines Ski Resort's Snowmaking System

Implementing RSView32 allowed Wisp Four Seasons Resort to customize an automated monitoring and control system for their snowmaking operation. The result was reduced costs, increased consistency and overall happier skiers.

Skiing effortlessly across the top of a crisp, white mountain is probably the last place you think about automated technologies. But none-the-less, some of the least-industrial locations are implementing automated technologies to help increase efficiency and production – whether it be producing snow or auto parts. Using technologies usually reserved for the factory floor, Wisp Four Seasons Resort, a leading ski resort located on Marsh Mountain in western Maryland, was able to greatly increase the efficiency of the resort's snowmaking process and reduce overall costs of snowmaking in an increasingly competitive recreational environment.

has reached 200 inches in years past, but with an average of 125 skiers a day, the powder tends to become packed down quickly. And with 23 slopes and trails totaling 14 miles on 80 acres of skiable terrain, Wisp has a lot of area

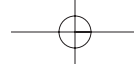


Fooling With Mother Nature

The art of making, or creating, snow for a ski resort is a lot more involved than Mother Nature would lead you to think. Skiers demand quality snow conditions, and ever-changing weather patterns can play havoc with even the best-laid snowmaking plans. Marsh Mountain averages about 93 inches of snow a year, and

that requires fresh, skiable snow. To offer the best skiing conditions for the resort visitors, Wisp depends on a system of snowmaking equipment – one of the largest in the world – to keep the snow fresh, and keep skiers coming back.





At Wisp, evaluating slope conditions and monitoring the operation of the snowmaking equipment had always been a time consuming and difficult task requiring constant attention. Many people working all kinds of weather conditions were required during each staff shift to move the snowmaking machines up and down the slopes and adjust the nozzles and settings.

Operators on the mountain had to change settings by hand to accommodate temperature and humidity conditions on the mountain. Because some of the snowmaking machines were on towers and on very steep terrain, it was very difficult and time consuming to adjust the machines and to bring new machines online. Operators also were required to manually monitor the machines to ensure they were working properly.

Wisp, realizing that their snowmaking operations were inefficient, began looking for ways to streamline the process. After collecting and evaluating data using Microsoft® Excel™ spreadsheets, Wisp was able to identify some areas of operation that could be more efficient. With making snow, it is important to have the right mix of temperature and humidity, because the colder the temperature and the dryer the humidity, the more water you need, as well as the opposite, the warmer the weather, the less water is needed. So, Wisp set out to develop a plan to increase snow production and identify ways to detect equipment problems earlier, reducing snowmaking costs for inefficient machines. While these were incremental improvements, Wisp was looking for a system that would make a bigger impact on their efficiency and productivity.

If You Can't Buy It, Make It

Wisp knew that an automated monitoring and control system could help the resort reduce operator workload, improve efficiency and reliability and save water. However, after evaluating systems in the industry, Wisp was unable to find a complete automation solution compatible with its snowmaking system. Instead of giving up, Wisp decided to develop a custom system with help from experts in other industries. Bob Yaste, Mountain Manager, Wisp Four Seasons Resort said, "We knew that an automation solution for snowmaking must be possible, but none of the manufacturers could supply a reasonable cost solution that would give Wisp the information and control it

wanted. Our goal was to develop a complete solution that would save us time and money – so we set out to build one."

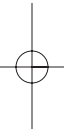
Wisp enlisted Beitzel, a value-added reseller, to help build a valve system for Wisp that would eventually become one of the world's largest and most energy-efficient snowmaking systems. The valve



system is capable of handling 500 psi. With the improved valve system supplied by Beitzel, and Rockwell Software RSVIEW32™ HMI software, Wisp is capable of producing over 36 inches of man-made snow in four days that cover 90 percent of the Wisp trails – effectively keeping up with snow demand and creating a much more efficient system. Each valve is embedded with a proprietary controller, based on ASCII protocol, allowing the controllers to communicate to RSVIEW32 via DDE. This allows RSVIEW32 to control and monitor the valve – one of the many reasons why RSVIEW32 was chosen for the system.

The Whole Ball O' Snow

To monitor weather conditions automatically, Wisp set up weather stations positioned strategically around the ski slopes that automatically monitor conditions and feed data back to a PC running RSVIEW32. RSVIEW32 software communicates with the snowmaking machines, telling the machines what adjustments to make based on the incoming data. The snowmaking machines then automatically adjust the settings and nozzles, eliminating the need for operators to constantly monitor conditions and change settings manually. Because the machines are now adjusted automatically, based on temperature and humidity conditions, the system is more efficient and can produce more consistent snow.



By using the automatic monitoring and adjustment system, Wisp was also able to reduce total expenses by more than 23 percent.

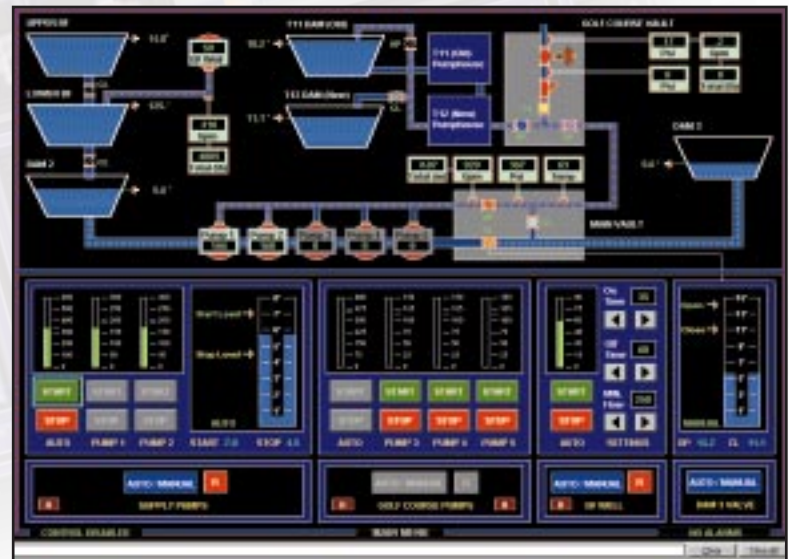
The water used for the snowmaking machines comes from ponds created by Wisp and is automated through a pump house, also located on the resort property. The new automated snowmaking system has allowed the resort to automate their pump house as well, eliminating the need for operators to constantly check the pumps. Allen-Bradley SLC 5/03™ programmable logic controllers regulate constant water pressure for the entire mountain, maintaining an efficient level of water use. The RSView32 software logs the water usage of the pumps and maintenance warnings that come in from the pumps or snowmaking machines. Through RSView32, data is collected every second and sent via radio modem to the offices at the base of the mountain. From there operators can control all pump house operations.

Tracking the Data

Since one of the criteria for Wisp was to have a low-cost, complete snowmaking solution, Yaste needed a way to eliminate other 3rd-party packages for collecting data. Wisp wanted an HMI system with an open scripting system that was flexible and easy to use. In some way, every HMI system had a limitation, until RSView32 released the version that embedded Microsoft Visual Basic® for Applications (VBA), as an integrated programming language. With RSView32, the system was designed to internally store the required data, from year-to-date totals, running totals of electrical and water usage, as well as comparison between machines and efficiency. With VBA, RSView32 can keep the memory tags (derived tags) updated with its internal value. So anytime you go in and out of RSView32, you come back in where you left off. This eliminated the need to use an external database. Yaste recalls, "Other systems would have been difficult to implement, but with VBA integrated in RSView32, it gave us a quick and easy way to implement keeping the derived tags current." Yaste added, "VBA enables us to centralize information, without writing a lot of code."

Finding the Right Mix

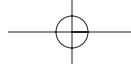
Because of the dependency on the weather, it was critical that additional snowmaking machines could be brought online without any glitches. RSView32 allowed Wisp to find the right configuration with the highest efficiency when bringing new machines online. With RSView32, Wisp was able to create a wizard to fill in new machine configurations, and make it as simple as filling in question boxes. With flow being based on tip size of the nozzle and pressure, the specification can be entered and tested to find the most efficient outcome. If the combination is not satisfactory, an operator can readjust the configuration by entering new data into the wizard, until an optimal solution is found. Once the machine configuration meets satisfaction, RSView32 accepts the new configuration and the default values



are automatically updated. Because of the RSView32 wizards, it now only takes minutes to bring a new system online, where as before doing the task manually could take hours.

Locating the Rough Spots

Not only is RSView32 being used to monitor the weather stations and make it easier to bring new machines online, RSView32 is making it possible to graph the "hydrants" on the mountain. Since RSView32 monitors the year-to-date total of water used on the slope, as well as the location the water is disbursed on the slope, the slope of the mountain can be graphed within RSView32.



Water usage is taken from different points of the mountain, converted to snow depth and then graphed to have a clear picture of the snow on the slopes. This allows WISP to add snow only to specific locations on the slope, and avoid waste. Skiers think this is a great benefit – it gives them great snow and a cheaper lift ticket.

Monitoring Performance

Over 100,000 data values were collected in the first snowmaking season. However, all this information is of no use unless the snowmaking crew can understand it. By using RSView32 graphs and graphical screens, any one of the snowmakers can visually see pressures, flows, machine settings and the current status of pumps and other associated equipment. Current data is matched to historical data, which enables the operator to visually see the performance of each type of snowmaker compared to its past performance. Through RSView32, electric usage for pumps, snowmaking machines and replenishment of water supply are also shown along with the associated dollar cost.

providers to develop a system that met all their needs. With an automated system, Wisp was able to cut down the cost of making snow, increase the consistency of production, reduce labor costs and create a system that was easy to maintain. This not only helps them cut costs for the resort, but allows them to offer visitors the best possible ski conditions for the area. Wisp no longer closes when it runs out of snow, it closes when the interest of the skier subsides.



Let it Snow, Let it Snow, Let it Snow

Because Wisp was determined to find a solution for their snow-making process, they were able to work with other solution

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