

Snow News

FALL 2006

FOR OWNERS AND OPERATORS OF SNOWMAKING EQUIPMENT WORLDWIDE

www.snowmakers.com

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Editorial

SMI continues to change and grow with our customers around the world. Energy efficient snowmaking continues to be the trend and SMI remains well positioned to drive technology forward. We have really advanced our SmartSnow™ automation products to adapt to the variety of needs and budgets.

Just as you have seen global consolidation in the lift and snow grooming vehicle side of our industry, we believe snowmaking will also consolidate some over the next couple of years. And SMI will continue to be

one of the major players. We have a full range of snow-making products from low energy towers, to any type of fan product imaginable, to the most complete and flexible range of automation available. We offer full construction and engineering design services. We also offer used and rebuilt equipment, upgraded to the latest technology.

SMI has recently added four automation specialists, along with additional people to help with our sales, engineering and administration teams to better serve your resort. We also expanded both our manufacturing facility and offices to accommodate this growth. SMI continues to invest in people, technology and facilities so that we can offer the latest products and services.

Thank you for your support of both SMI's people and products. Please call us for all your snowmaking needs.

Kid PoleCat

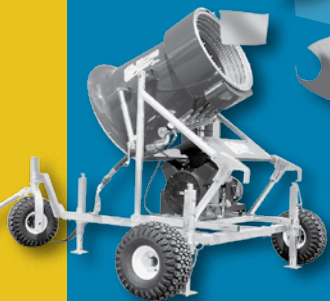
SMI is proud to introduce the Kid PoleCat—a versatile new snowmaker with a powerful 7.5 HP fan and 15 water delivery nozzles that can be customized to achieve the perfect flow for specific weather conditions. The new design is available with many options, including galvanized carriage or tower mount, oscillation, heated valves and full automation.

Like other members of the PoleCat family from SMI, the new low-maintenance design delivers large volumes of excellent quality snow, and excels in areas where source water contains small particulates and dissolved dirt.

Available with either a piston or vane compressor, the Kid PoleCat offers precise delivery and a long throw, making it particularly effective on narrow trails. As SMI's lightest and most portable design, it can be positioned exactly where it's needed most. For more information, go to www.snowmakers.com/products.



SMI Kid PoleCat Snowmaker




SMI Snow Makers
SMI COVERS THE WORLD

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TECHNOLOGY :: LONGEVITY :: SERVICE



Technology of Snowmaking: Automation

Many people are confused about the many aspects of automation or do not understand all of the options available. So we have developed some ideas for you to consider as you investigate alternatives.

1 PLANT AUTOMATION. Let's start with plant automation which typically means your pumping stations and/or compressors. Do you have automatic pressure control, auto line filling, auto starting/stopping and sequencing as demand rises and falls. These technologies are common in other industries like oil and gas so the components are common and standard. SMI can help you with plant automation that is straightforward to cost justify.

Your power systems and power monitoring may also be a candidate for automation. Your resort weather should also be considered for data logging and resort wide accessibility. Resort security, slope and parking lot lights, resort music and other aspects of resort operations can all be monitored and controlled from SMI's SmartSnow™ software.

2 HILL AUTOMATION. Snowmaking automation on the hill for the hydrant and snowguns gets very complicated very quickly as there are many different snowgun types and hydrants now available. The global quantities of these components are relatively small in the industrial world thus making these pieces unique to snowmaking.

3 FULL AUTO/SEMI AUTO. Most vendors and mountain resorts agree that full snowmaking automation is defined as: Auto start machine and pumps, Auto adjust machine and pumps, Auto stop machine and pumps, Auto drain machine and pumps, and Snowgun and plant communications.

Full automation could be as simple as 10 watersticks, no additive, 1 single pump, one weather device (dry bulb only) that is programmed to start at 10° F. Once 10° F is reached, the pump starts and feeds 400 psi water to the 10 sticks that only have a 2-way ball valve always open. This ball valve allows the water flow to be manually stopped if there is a snowgun problem. This is indeed defined as full automatic, but is very simple, offers a limited range of production and no flow flexibility.

Another example could involve a 500 hydrant system with 300 full auto hydrants with fixed snowguns, 100 manual towers and 20 semi-auto carriage fans for the final 100 water hydrants.

Full automation can become very complex with limited water and/or air quantities forcing a resort to prioritize snowguns and water flow to specific areas. Automation may be designed to overcome limited water capacity or power available. A resort may have the luxury to

program only to conditions to refresh 8 trails for one hour each. Or if water is limited on the higher hydrant count trails, then which hydrants are run when? Maybe steeps are programmed for drier snow?

Semi automation has literally hundreds of solutions. Here are some of the many ways to define semi automatic:

SNOWGUN FUNCTION	RESORT A	RESORT B	RESORT C	RESORT D
Start	Manual	Auto	Auto	Auto
Stop	Manual	Auto	Auto	Manual
Adjust	Auto	Manual	Auto	Auto
Hydrant	Manual	Auto	Manual	Manual
Communications	No	No	Yes	No

These are just a few examples to show the variety of alternatives for snowmaking automation available today.

4 SNOWGUN TYPES. Further discussion is required for snowgun types here as the snowgun type and method for adjustment obviously impact snow quality and how the snowgun is started, stopped and adjusted.

BASIC SNOWGUN TYPES:

- on/off–no adjustment–zero valve steps: water only snowgun or fixed flow (water and air) low energy tower snowgun
- 1 valve–1 adjustment–1 valve step: simple fan or low energy tower with one water valve to add flow in colder conditions
- 2 valves–3 or 4 valve steps: fan or low energy tower
- multiple valves, adjustments and valve steps: air/water snowgun or fan snowgun with lots of flow adjustment capabilities

Do you adjust water only or air too? Are communication wires required to operate snowguns? Is power required at each snowgun location? How



▲ Automated Standard PoleCat

much power? Do individual or pods of snowguns get started, stopped and adjusted?

In general, the simpler the snowgun, the less snow quality adjustment you have and the more limited temperature range the product performs within. However, the simpler the snowgun, the simpler it is to automate.

5 INTELLIGENCE: CENTRAL OR DISTRIBUTED. Should each snowgun have intelligence? Distributed intelligence means that each snowgun has some type of computer at each snowgun or to

control each pod or trail of snowguns. Central intelligence has all the brains in one central location and each snowgun has limited or no PLC/ computer. Distributed intelligence allows individual control, feedback and flexibility. It allows you to run even if your central computer or communication links go down. Central intelligence wherein all controls, commands and communication come from the central computer is less expensive, but leaves you vulnerable to being down if there are problems with the main computer or communications.

6 WEATHER STATIONS. How many weather stations are needed? Do you need to monitor temperature and relative humidity at each snowgun location? Are there different weather zones on the mountain? What is the quality of the monitors you are using? SMI has developed a custom aspirated



▲ Automated Kid PoleCat

weather station that is much faster reacting to changing conditions.

How will you supply power to a remote station? SMI has a solar powered weather station now available (see photo).

7 HYDRANT CONTROL. Is your piping buried or surface? Are you retrofitting existing trails or adding new trails? Do you have confined space issues with vaults? Do you need to auto flush hydrants before feeding water to snowguns?

SMI offers many hydrant alternatives including a hydrant actuator that bolts onto existing hydrant including Ratnik, Rogers, HTM, Larchmont and Mathewson. This unit is menu driven to provide the correct opening and closing torques, the correct turns to full open and close, and a position encoder to know where it is at all times. The hydrant actuator will fail close if power is lost and you have the battery backup option. The hydrant will throttle through the full water pressure range to allow extremely precise water flow control in 0.1° F wet bulb increments if you like.

Another hydrant/valving alternative is SMI's Solenoid valve manifold for vault/pit mount which requires a dry, heated area with good

▼ State-of-the-Art Central Control Room at Wisp

drainage. Valves open and close 100% only so no throttling capabilities. Valves will fail closed on power loss.

Or perhaps you want to "fully automate" your snowguns with the exception of manually opening and closing the water hydrant. This may work well if your resort has older surface piping.

8 PRESSURE SENSING/SNOWGUN FEEDBACK. Do you want to know water pressures at each snowgun? Do you want to know if the snowgun starts/stops after the commands are sent? Pressure sensing is also an option to consider.

9 MASTER/SLAVE CONCEPT. What about having one master fully equipped snowgun with weather and advanced PLC controls and using additional simple read only snowguns in that pod? These could be portable slaves to get open that are removed after opening.

Alternatively, a shorter lower vertical trail, you could use one "smart" snowgun and the rest of the trail guns that experience similar weather conditions slaved to it.

10 ADVANCED OR BASIC INTELLIGENCE. An advanced intelligence snowgun may have a PLC with lots of data, alarming and individual weather station.

A basic intelligence snowgun may be individually addressable for assigning any weather station, have individual snow quality adjustment with basic communications but have limited input/output variables for alarming, pressures and other data. Alternately the snowgun may have very limited intelligence such as "read only."

11 COMMUNICATION OPTIONS. Hardwire with twisted pair, Cat 5 Ethernet, or fiber optic? What about wireless via Ethernet or radio?

There are costs and benefits associated with each communication technique. Or maybe standalone with no communications is OK? What about lightning issues? Lightning troubles can become very expensive.

12 SOFTWARE AND CONTROLS. What type of software drives the system? What is the underlying programming language? How many technical support people are in the company? What do the reports look like? Is there a licensing fee up front, annually? What about updates? What happens after warranty expires and you need help? What does it cost you?



▲ Solar Powered Weather Station

SMI's SmartSnow™ has been developed specifically for SMI, is Microsoft based, and supported by 8 automation specialists. The screens are colorful and packed with easy to view data and menu driven. The graphing and reporting are excellent. Updates can easily be done over a remote connection.

As you can see, there are lots of ways to utilize snowmaking automation. And there are lots of questions for you to ask vendors. Maybe you don't want flexibility at all. SMI has customers asking all these questions and more. And we have sold a variety of solutions using all the iterations above. Call SMI today for more details on how you can get started.

SUMMARY. As you have just read, snowmaking automation for the guns, hydrants and communications offer a variety of options.

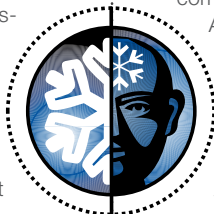
And with these options come numerous pricing levels as well. In general, the simpler the automation, the lower the price position.

SMI's approach is not a one size fits all neither to snowmaking nor to automation. SMI's philosophy of offering a full range of products with lots of configurations and features carries into automation as well. We want our customers to totally understand the options available and what you expect to purchase.

The benefits and justification for automation need to be considered on a case by case basis. The two big snowmaking operating costs are labor and power and the big benefit of automation is maximizing snow production. Some areas to help justification for the added automation capital cost include:

- Fast startup
- No gun setup, take down or transport if using towers

(Continued on page four)



Automation

(Continued)

- Auto adjust capability
- Less labor to start, adjust and stop
- Better information
- Faster opening of resorts and trail counts
- Quicker recovery from bad weather events
- Charge full ticket price earlier

A big step towards improving your snowmaking efficiency may be to simply add more tower guns to eliminate set up times and increase efficiency via added hang time. Then the next step of automation can bring further benefits.

The benefits of moving from an existing 20 snowgun manual fleet with 120 hydrant positions to a 120 fixed gun full auto system will be considerable. Then compare this to automating 120 fixed towers from manual to semi automatic or full automatic. In other words, be careful including equipment upgrades in the auto justification equation.

Adding snowmaking automation to a new trail is generally easier than retrofitting existing trails. Yet if they are the signature trails that can have vastly improved snow surfaces, then automation should be considered.

Most resorts tell SMI they have seen solid benefits in fast startup and auto adjustment by greatly increasing snow production, while reducing but not eliminating labor.

SMI recommends each solution on a unique and individual basis. For more information on our automation offering, go to www.snow-makers.com/products/automation.html.



▲ *New Kid PoleCat*



▲ *Viking SnowTowers*

SMI Technical Support and Automation Field Team

- | | |
|-----------------|----------------|
| • John Brobst | • Troy Mast |
| • Tom Fillmore | • LaVern Maust |
| • Augie Hof | • Troy Morgan |
| • Nic Horgan | • John Parker |
| • Rick Jeffreys | • Arlan Rust |
| • Carl Laco | • Doug Vaughn |

SMI Successes

Jack Frost/Big Boulder, PA

www.jfbb.com

Adding 126 tower fans on primary trails



Marmot, Alberta

www.skimarmot.com

New state-of-the-art SMI Super PoleCat turnkey system



Snow Summit, CA

www.bigbearmountainresorts.com

Adding 26 full auto radio controlled Super Wizzards



Mad River, OH

www.skimadriver.com

Adding new terrain and tubing covered by 36 Super PoleCat Snowtowers



Snow Creek, MO

www.skisnowcreek.com

Adding new tubing area and PoleCats



Whistler, B.C.

www.whistlerblackcomb.com

Adding 17 full auto radio controlled Super PoleCats



Mt. Ruapehu Ski Areas

www.mtruapehu.com

Added 13 Super PoleCats



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