

# Flipper: A Self-Cleaning Storm Board

Story and photos by John Brennan

**S**nowmass ski area has semi-dedicated four automated weather stations to providing data for the Aspen Skiing Company's internal web site. Two of these stations record 24-hour snow totals. For many seasons, Snowmass employees installed the weather stations before October 1<sup>st</sup>, and prior to the lifts opening, any new snowfall meant daily trips to the two snow sites to clean the 24-hour storm boards. The challenge was to develop a 'self cleaning board.'

In the mid 1990s, it was common to load PC208W software onto the company's Snow Reporters computers. When Campbell Scientific intro-

duced their Real Time Data Monitoring (RTDM) software, it was apparent that it would provide a sensible solution. RTDM graphically presents data from any number of data loggers, a function accomplished with one server scheduled to call the data loggers on an hourly basis. While the resulting file can be uplinked directly to an internet site, marketing departments typically like to put their spin on things prior to feeding the public.



Screen capture showing output from the Flipper

In order to provide forecasters and the public with the most accurate information, most ski areas utilize a 24-hour snow total in addition to a settled depth value. While it is certainly possible to program a data logger to determine depth change over a given time period, settlement and other factors can skew what info is being presented. To keep matters consistent, the boards need to be cleaned at the same time daily.

Snowmass presented the challenge of designing a self-cleaning storm board to Greg Hoffman, an electrician and lift mechanic at Snowmass. His design consists of two fiberglass sheets separated by tubular steel. Laminated to the back of these sheets are heat panels originally manufactured to keep bathroom mirrors fog free, and Styrofoam insulates the void between the top



Top: Flipper designer Greg Hoffman wiring the bathroom mirror defrosters.

Left: The guts of the flipper.

up to the 24 volts necessary to operate the circuitry. Six magnetic relays create the logic necessary to reverse the direction of the servomotor and to heat the correct side of the board. The motor is a vintage war surplus affair originally used to crank the wing flaps on B52s. It is a super high torque unit that has built-in limit switches so the board can be stopped firmly on the pegs. While the servomotor would be the major power user, the 5-6 amp draw for less than 10 seconds daily shouldn't affect the batteries on remote sites too severely.

We have programmed the data logger to check the 9 a.m. new snow total. If this number is above 1.5 cm, the data logger rotates the board 180°. When the board is triggered to rotate, the heat panels on the appropriate side of the board are turned on for a preset time period to remove any residual snow. It is also possible to trigger the board remotely from a PC or laptop using Campbell software. Most of the equipment came off the shelves of the Lift Maintenance department, and we estimate 30 total man-hours to build and install it. However, all the parts are available from Grainger, and we estimate that total cost of building a similar board using parts from that source would be around \$1000.

This was our prototype unit so if anyone has any questions, suggestions or modifications, contact me at [jbrennan@aspensnowmass.com](mailto:jbrennan@aspensnowmass.com)

References:  
[www.clearproducts.com](http://www.clearproducts.com)  
[www.grainger.com](http://www.grainger.com)

## Awards Committee Calls for Nominations

**D**enny Hogan, the Chair of the AAA Awards Committee, has called for nominations for the AAA's various awards and honors. The deadline for submitting nominations is September 1, 2003. The AAA will present the awards at its Annual Meeting in Alta, UT, in October. The awards petitions are available from Denny Hogan at [denny@aaa.org](mailto:denny@aaa.org), or PO Box 74 Silverton, CO 81433. Contact Denny with any questions about the various awards and nomination procedures.

**Honorary Membership:** Honorary Membership is the highest award that the AAA bestows. It is given to a person who has distinguished him or herself by special achievement in the field of snow avalanches. Such distinction typically comes from outstanding research, avalanche forecasting, control or education accomplishments. Nomination requires a petition by five AAAProfessional Members in good standing, a short biographical sketch of the nominee and a citation of no more than 300 words. Current members of the Governing Board are not eligible for the award. Recent awardees include: *Doug Fesler* (2002), *Bob Brown* and *Sam Colbeck* (2000), *Sue Ferguson* (1998), *Peter Schaefer* (1996) and *John Montagne* (1995).

**Bernie Kingery Award for Dedicated Professional Practice:** This award emphasizes dedicated avalanche field professionals in honor of Bernie Kingery, who was Mountain Manager at Alpine Meadows Ski Area at the time of his death in an avalanche. Its purpose is to recognize sustained career contributions of dedicated field professionals engaged in avalanche forecasting, hazard mitigation, research or education. Only AAA Professional Members are eligible for this award. The nomination process is the same as for honorary membership. However, members of the Governing Board are eligible during their terms, and the award requires a quorum of the Governing Board with approval by two-thirds majority of the voting board. Recent awardees include: *Tom Kimbrough* (2002), *Don Bachman* (2000), *Liam Fitzgerald* (1998), *Jim Hackett* (posthumously) and *Binx Sandahl* (1997) and *Larry Heywood* (1996).

**Honorary Fellowship Award:** This award is made to individuals who have contributed significantly to the quality and success of avalanche related programs in countries other than the United States. It recognizes avalanche workers or researchers who have made significant contributions and communicated their work to peers in the U.S. Membership in the AAA is not a requisite for the award. Members should submit a petition and 200-word citation to the Awards Committee Chair. Recent Awardees include: *Kazuo Fukuyama* and *Dr. Horst Schaffhauser* (2002), *Karstein Leid* (1998), *Pavel Chernouss* (1996), *David McClung* and *Tsutomu "Tom" Nakamura* (1994).

**Special Service Award:** This award honors specific and outstanding achievements in North American snow avalanche work. The Governing Board generally initiates the nomination and approval. The recipient need not be a member of the AAA. Recent awardees include: *Steve Conger* (2000), *Alan Dennis* (1998), *Bruce Jamison* (1997), *Liam Fitzgerald* (1996), and *Betsy Armstrong* and *Rob Faisant* (1994).

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