

Case Study

Preventing Floods Through Accurate Snow Temperature Monitoring

Company

MicroStep-MIS

Industry

Environmental monitoring and meteorological systems

Products

Exergen IRT/c.10 non-contact sensors



In the mountains of Kazakhstan, where winter temperatures of -40°C are followed by rapid spring warming causing sudden snow melt, accurate temperature monitoring is essential to protect communities from catastrophic flooding. In response, MicroStep-MIS, a specialist developer and manufacturer of climate monitoring hardware and information systems, has equipped over 20 meteorological stations with Exergen infrared temperature sensors to predict snow melt rates and provide reliable flood warnings.

Challenges

Flood forecasting depends on accurately measuring the surface temperature of a snow field as it best indicates melting speed and likely water volume. Early manual measurement methods required tremendous effort and time. Later, PT100 contact sensors were used but they were unreliable. They tended to measure either the ambient temperature above the snow or the core temperature below. So MicroStep-MIS set out to develop a new method to accurately and reliably monitor the actual surface temperature of the snow.

Solutions

MicroStep-MIS selected Exergen IRT/c.10 sensors from CleverIR for their non-contact capability, field of view characteristics and ability to operate in sub-zero temperature environments. Mounted at a safe distance above ground and angled downward, each sensor monitors the snow surface. Their 10:1 field of view (approximately 5° angle) ensures consistent measurements regardless of varying snow depths. Whether snow accumulation is minimal or substantial, the sensor reliably tracks the critical surface temperature zone.

Benefits

Reliable measurements with automated data collection are now possible regardless of snow thickness. Using single non-contact sensors is also more cost-effective than having multiple contact sensors. The unpowered sensors are able to withstand Kazakhstan's extreme conditions without drift or performance degradation which reduces maintenance requirements.



The transition to automated non-contact monitoring has transformed flood prediction accuracy while dramatically reducing operational costs and labor requirements.

Results

Some sensors have operated continuously for over five years, all functioning without maintenance or recalibration. The reliable temperature data enables precise calculations of snow melt rates and water volumes, delivering early flood warnings that protect communities downstream. The transition from manual measurement and unreliable contact sensors to automated non-contact monitoring has transformed flood prediction accuracy while dramatically reducing operational costs and labor requirements.

Conclusion

MicroStep-MIS's use of Exergen sensors demonstrates how appropriate sensor technology can save lives. The IRT/c.10 sensors solved a critical measurement challenge, enabling accurate flood forecasting in one of the world's most demanding climates. Kazakhstan communities now benefit from early warnings that prevent dangerous flooding situations. The system's five-year track record proves that well-designed non-contact sensors deliver sustained performance in extreme conditions while eliminating maintenance issues associated with traditional measurement methods.