

Fact Sheet

A MICROWAVE DOPPLER RADAR SYSTEM FOR MOTION DETECTION AND KINEMATIC MEASUREMENTS OF RIVER ICE

PROBLEM

River ice motion detection and measurement under winter frazil ice flow and spring ice breakup conditions are fundamental for analysis of river dynamics and to provide early warning of imminent potential flooding hazards to river communities.

HISTORY

Ice motion detection methods include visual measurement and simple broken-wire alarm systems. Accuracy of visual measurements depends on the experience of a human observer. Observations of events can be obscured by inclement weather or nightfall.

Broken-wire alarm systems indicate only the initial movement of an ice flow; the first movement of ice destroys the sensor. Sensors of this type cannot provide velocity or acceleration information.

SOLUTION

A microwave Doppler radar system has been developed for detecting and measuring the motion of river ice (U.S. Patent # 5,585,799). This invention provides ice kinematics data on the beginning and end of event, duration of event, ice velocity, and acceleration. The system can detect, measure, and record these data for all river ice conditions, including frazil, sheet, and rubble ice. It can be easily interfaced to an alarm annunciator. The radar can easily be installed on bridge decks, piers, and on-shore structures.

This invention has the following advantages:

- Effective detection of frazil, sheet, and rubble ice motion
- Unattended automatic operation
- All-weather operation
- Day and night operation
- Provides real-time data
- Detects and measures multiple events

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