

Environmental Challenge

Issues with year-round, continuous monitoring of the hydro-ecology of Arctic freshwater lake systems:

- ▶ Remote Locations create logistical problems
 - Difficulty visiting sites frequently
 - High operational costs
 - Occupational health and safety considerations
 - Extreme weather conditions



The AXYS Solution

In cooperation with Environment Canada/Water & Climate Impacts Research Centre located at the Department of Geography, University of Victoria, AXYS designed and built a fully-automated Ice Buoy and Subsurface Smart Mooring System for continuous unattended year-round monitoring of:

- Meteorological Conditions
- Lake Ice Cover (Fall initiation, Winter growth, Spring breakup)
- Light Penetration into the Lake (through ice in Winter)
- Lake Water Quality (chemistry, temperature, oxygen levels)

Ice Buoy

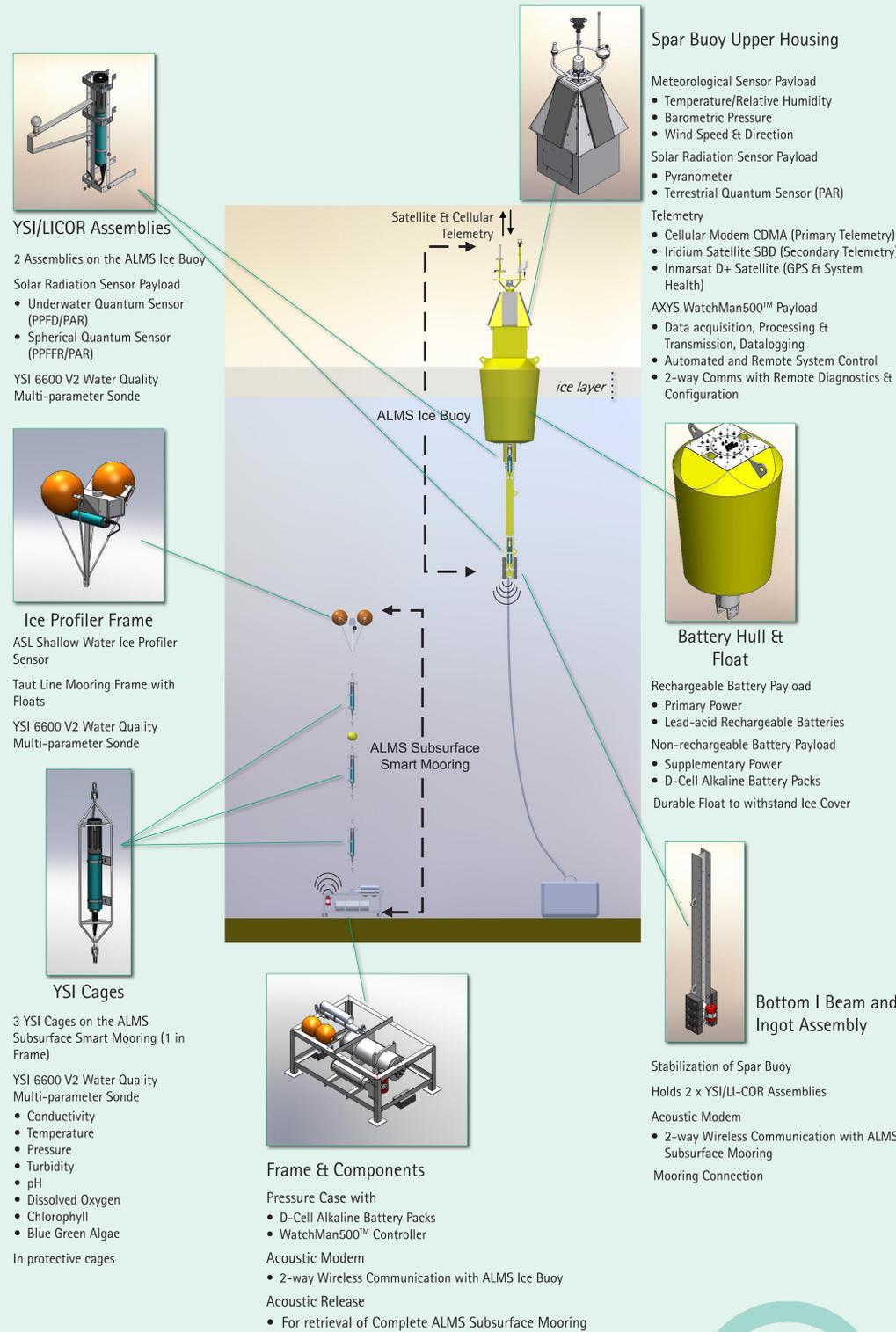
- ▶ Measures weather conditions, incoming solar radiation & light penetration, as well as water quality in the lake at multiple depths
- ▶ Complements and relays information deeper in the lake from the subsurface mooring

Subsurface Smart Mooring

- ▶ Measures water quality at multiple depths
- ▶ Ice Profiler Sensor measures the development, growth and decay of the lake ice cover
- ▶ Collected data is transmitted to Ice Buoy via acoustic modem

Arctic Lake Monitoring System Development

System Design: Sensors & Components

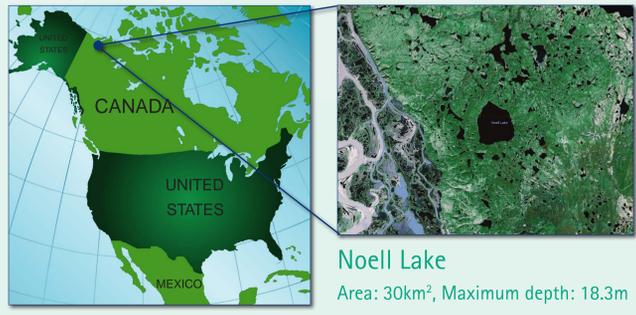


For more information visit www.axystechnologies.com

Arctic Lake Monitoring System



The Arctic Lake Deployment

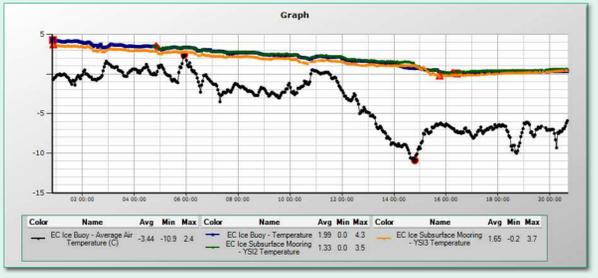


ALMS deployed by helicopter in Noell Lake, Inuvik in September 2010



Data Management

Full data sets from the ice buoy & subsurface mooring system are transmitted in near real-time to a base station located at the Water & Climate Impacts Research Centre via Cellular or Satellite telemetry.



24-hour Air and Water Temperature data set that graphically illustrates the Noell Lake freeze-over.

ALMS Data -> Arctic Lake Ecosystem Research

ALMS time-series data provides a temporal understanding of Arctic lake ecosystems and assists in the development of hydro-ecological models for cold regions freshwater systems lakes in the following research areas:

- Landscape Hydrology and Geochemistry
- Lake-Ice Modeling
- Aquatic Productivity and Carbon Dynamics

These models will be used to assess the vulnerability of Arctic lake ecosystems to disturbance, such as climate variability/change and those related to Canada's northern regions.



The AXYS Team with the Ice Buoy: (from left to right) George Puritch, Chris Ng, Tony Ethier