VAISALA
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VAISALA
Reliable.

Environment Canada's CLDN
Canadian Lightning Detection Network

About Vaisala

Vaisala develops, manufactures and markets electronic measurement instruments and systems for environmental measurement and the measurement needs of industry. Vaisala sensors, instruments and systems are used the world over by organizations that need to measure the environment with great accuracy and consistency. Vaisala offers a comprehensive range of products that provide the measurement data necessary for forecasting the weather, protecting the environment and improving the safety of air and road traffic. The parent company, headquartered in Vantaa, Finland, is listed on the Helsinki Exchanges (HEX).

For more information visit www.vaisala.com

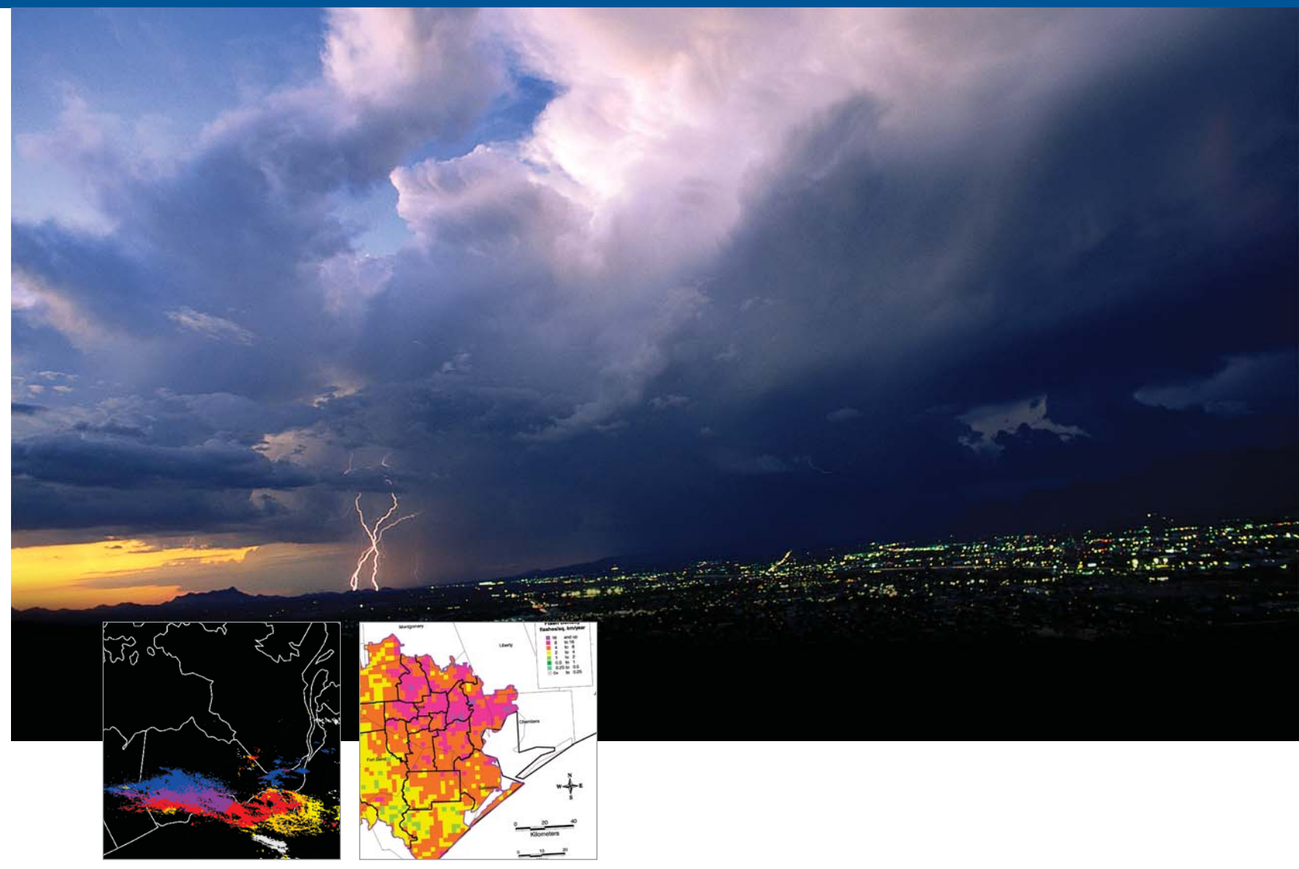
About NLDN and CLDN

One of Vaisala's recognized area of expertise is lightning. Vaisala Thunderstorm is the lightning-specialty business unit within the Vaisala Group. Lightning-sensitive operations around the world rely on Vaisala's lightning warning, tracking, mapping and analysis systems and services to save lives, protect property and reduce economic losses caused by lightning.

The Network Control Center (NCC) for the U.S. National Lightning Detection Network® (NLDN) and the Canadian Lightning Detection Network (CLDN) is based in the Vaisala Tucson Operations. The NLDN and CLDN provide users of lightning data seamless information with no degradation in DE or accuracy along or across any nation, provincial, territory, or state border. Together the NLDN and CLDN provide the most comprehensive lightning monitoring solution in the world.

For more information on Vaisala Thunderstorm, please visit www.vaisala.com/thunderstorm.

For more information on the CLDN, please visit http://weatheroffice.ec.gc.ca/lightning



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24/7 lightning tracking across Canada

The No. 1 Source for Lightning Data in Canada

The Canadian Lightning Detection Network is the only lightning information system monitoring cloud-to-ground lightning activity across Canada, 24 hours a day, 365 days a year.

Weather forecasters in both public and private sectors use real-time lightning maps and individual lightning strike characteristics from the CLDN to closely monitor thunderstorm development, strength, and paths for more accurate severe weather forecasting and to issue warnings.

Operations that are affected – forestry, electric power, airports, telecommunications, explosives handling, mining and more – rely on CLDN lightning data to tell which resources and facilities are at increased risk from thunderstorms.

CLDN up-to-the-minute lightning information is used for monitoring current conditions and for studying past events. Since 1998, the CLDN has been reporting cloud-to-ground lightning strokes and flashes; creating an archive of lightning flash and stroke data used for statistical and forensic analysis.

Vaisala's lightning detection technology used in the CLDN and network performance have been scientifically validated. Network operations and every CLDN sensor are continuously monitored to ensure data quality and proper operation.

The CLDN is owned by Environment Canada.

Key applications for CLDN lightning data

Weather forecasting: detects and helps predict severe weather for public warning

Electric power: preposition field crews to respond to approaching storm threats. Statistical analysis of lightning data supports engineering, planning and performance enhancement

Air traffic control: re-route aircraft around hazardous thunderstorms

Airports: suspend high-risk activities such as ramp operations and fueling during lightning threats

Insurance and arson: investigate lightning to determine the cause of property damage or fire

Power-sensitive operations: prepare for storm-caused power outages by switching to back-up power before operations are impacted

Hazardous materials handling: warn personnel working near explosives and flammable materials to evacuate

Forestry: dispatch fire fighting crews to suspected fire starts for more successful initial attack, narrowing the patrol and search areas

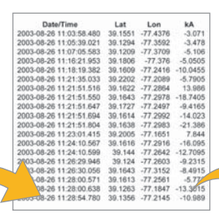
Golf and outdoor recreation: warn players and spectators to seek safety from storms

Aerospace: monitor weather for safest conditions for satellite launches

How the CLDN Works

CLDN consists of more than 80 remote, ground-based Vaisala lightning sensors

Sensors send raw data via satellite to the Network Control Center (NCC) in Tucson, Arizona



Date/Time	Lat	Lon	kA
2003-08-26 11:03:58.480	39.1551	-77.4376	-3.071
2003-08-26 11:05:39.021	39.1294	-77.3592	-3.478
2003-08-26 11:07:05.583	39.1209	-77.3709	-5.106
2003-08-26 11:16:21.953	39.1806	-77.376	-5.0505
2003-08-26 11:18:19.382	39.1609	-77.2416	-10.0455
2003-08-26 11:21:35.033	39.2202	-77.2089	-5.7905
2003-08-26 11:21:51.518	39.1622	-77.2864	13.986
2003-08-26 11:21:51.550	39.1643	-77.2978	-18.7405
2003-08-26 11:21:51.647	39.1727	-77.2497	-9.4165
2003-08-26 11:21:51.694	39.1614	-77.2992	-14.023
2003-08-26 11:21:51.804	39.1638	-77.2983	-21.386
2003-08-26 11:23:01.415	39.2005	-77.1651	7.844
2003-08-26 11:24:10.567	39.1616	-77.2916	-16.095
2003-08-26 11:24:10.599	39.144	-77.2642	-12.7095
2003-08-26 11:26:29.946	39.124	-77.2603	-9.2315
2003-08-26 11:26:30.056	39.1643	-77.3152	-8.4915
2003-08-26 11:28:00.571	39.1613	-77.2561	-5.73
2003-08-26 11:28:00.638	39.1263	-77.1847	-13.3015
2003-08-26 11:28:54.780	39.1356	-77.2145	-10.989

Within seconds, the NCC's central analyzers process information on location, time, polarity, and amplitude of each stroke

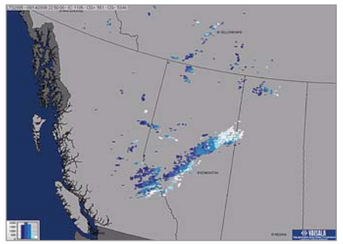
Lightning information is sent to users across the country

Real-time and Historical Lightning Data for Critical Decisions

Live lightning tracking to save lives and protect property

Meteorologists use real-time CLDN data to closely monitor thunderstorm development, strength, and movement for issuing severe weather warnings. Lightning is a fast and accurate indicator of severe weather and can also help identify hazardous weather where other observations can be less effective, such as in mountainous areas where radar images may be blocked and remote areas lacking other data.

Managers responsible for human safety, property protection, risk management, and productivity at operations that are sensitive to lightning and thunderstorms rely on CLDN data for early warning of lightning and thunderstorm threats. By knowing when and where lightning is active, planned precautions can be taken early to reduce vulnerability and risk.



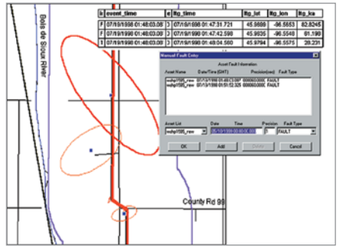
Vaisala LTS2005 Real-time Lightning Tracking Software maps CLDN data and provides estimated time of arrival to target locations and automatically monitors lightning activity in user-selected areas.

Historic lightning information for research and analysis

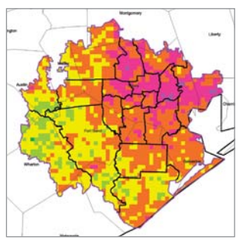
Since 1998, the CLDN has recorded cloud-to-ground lightning strokes and flashes to create a valuable lightning archive database used for statistical and forensic analysis.

Meteorologists, electric power, arson-investigators, insurance companies, and land management agencies use historic CLDN data to correlate and document suspected lightning damage with recorded lightning activity. A specific lightning incident can be examined in detail or researched more comprehensively, covering large areas over days or weeks.

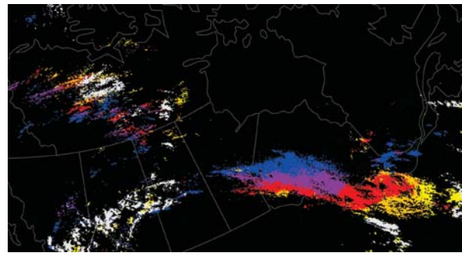
Seasonal or multi-year studies of lightning trends in a specific area are important for lightning risk assessment for site selection and designing optimal lightning protection schemes.



Vaisala's Fault Analysis and Lightning Location System (FALLS®) uses historic CLDN data to pinpoint lightning activity relative to outages and damage.



Vaisala FALLS® uses CLDN historic data to analyze lightning density relative to fixed assets to aid in the design of better lightning protection schemes.



Reporting locations and detailed characteristics for flashes and strokes

CLDN flash data provides time, location, polarity, amplitude of each cloud-to-ground lightning flash. However, up to 20 return strokes can make up a flash and these strokes often strike the earth in different locations up to sixteen kilometers apart.

CLDN stroke data provides time, location, polarity, and amplitude of these strokes, providing the very detailed data needed for in-depth lightning analysis and lightning incident investigations. Flash data is most often used for general trending of lightning events; stroke data is critical for understanding and detailing specific incidents.

Verified accuracy and closely monitored reliability

CLDN performance is measured in two ways: location accuracy and detection efficiency. Median stroke location accuracy, or the typical margin of error for locating a cloud-to-ground strike, is scientifically validated at 500 meters.

Flash detection efficiency, or percentage of cloud-to-ground lightning flashes detected by the network, has been verified to range from 80 to 90 percent across most of Canada for those events with peak currents above five kiloamps.

The network and every CLDN sensor are continuously monitored to ensure data quality and proper operation. CLDN uptime has been 99.7 percent or better since the network was installed. Every lightning event is accompanied by quality control parameters that provide an objective level of confidence for making informed decisions.