

Lightning Safety in a Flash

/ VAISALA AIRPORT LIGHTNING INFORMATION SYSTEM (ALIS)



VAISALA

Global Threat to Airports

Proven. Global.

The Vaisala Airport Lightning Information System (ALIS) opens a new era of universal high-performance lightning detection for airports of all sizes. It provides superior near-precision lightning detection network data as a subscription service – at a fraction of the cost when compared to installing and maintaining a standalone precision lightning detection network.

Improved Thunderstorm Safety for Airports

ALIS is a hosted service powered by Vaisala's unique Global Lightning Dataset GLD360™. For airport professionals Vaisala ALIS provides an instant web access to an advanced lightning display with clear alarm areas and messages – usable with only minimal training.

Vaisala ALIS can easily be deployed without any specialist hardware or

software investment or maintenance costs. You only need to provide airport location information, the desired alarm radius, email and cell phone contact details and sign a one or five year service agreement. Your advanced lightning detection solution can be up and running practically in a flash.

High Performance for High-Risk Situations

The GLD360 data range covers 500 km in all directions from the airport, which greatly surpasses the performance of conventional single-point lightning sensors. It also allows thunderstorm detection and tracking beyond the range of C-band and S-band airport weather radars. In addition, GLD360 provides superior lightning location accuracy from the airport out to distances far beyond the effective range of single-point sensors.

Single Solution Against Multiple Aviation Threats

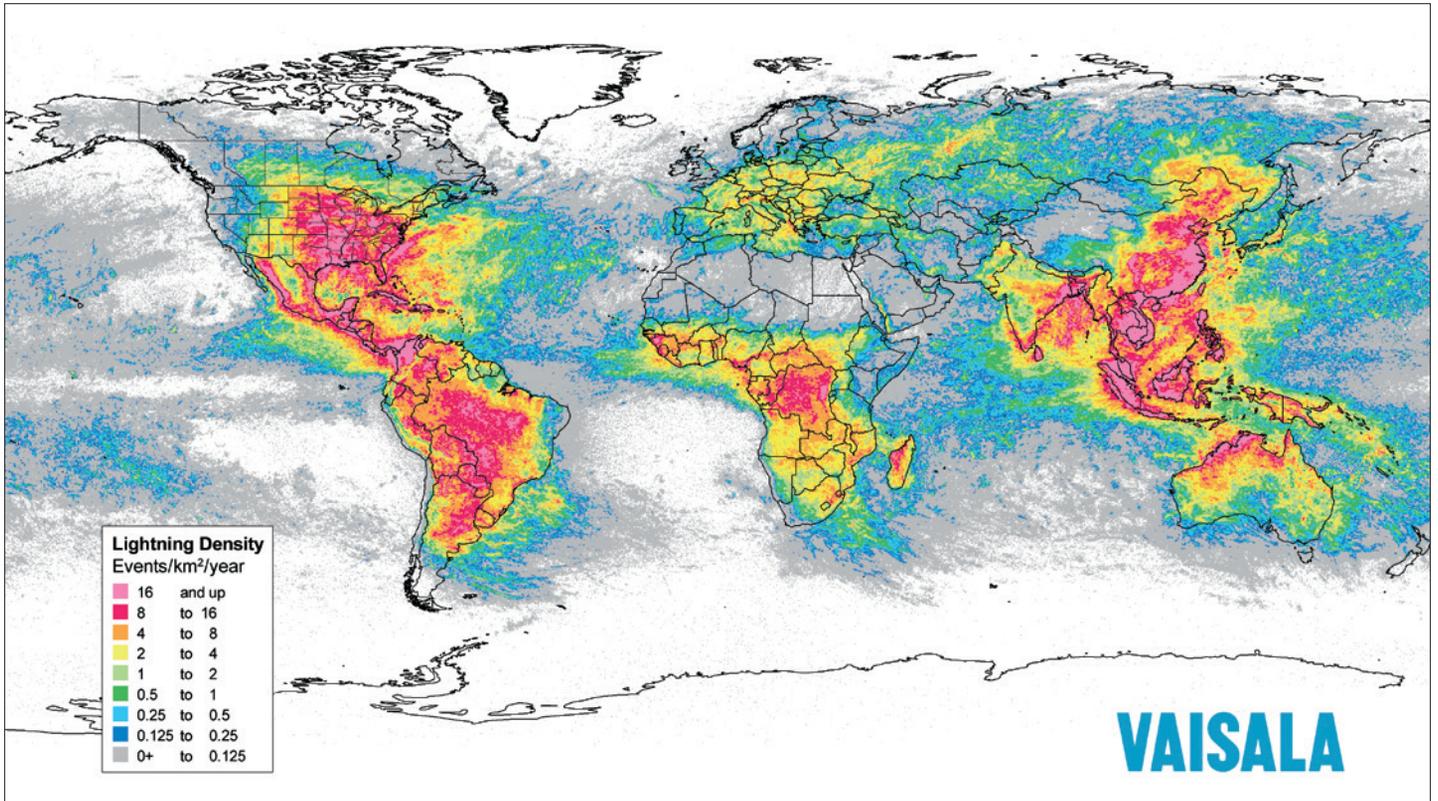
Vaisala ALIS helps airports improve safety and efficiency against a number of weather related aviation hazards both in the air and on the ground.

Virtually all airports in the world are annually affected by thunderstorm activity. Lower latitude tropical locations often experience thunderstorms throughout the year, while shorter, but sometimes more intense, thunderstorm seasons are common at higher latitudes.

Thunderstorms pose various hazards to airplanes during terminal approach as well as to ground operations personnel. The hazards include:

- Dangerous cloud-to-ground lightning
- Low level windshear
- Poor visibility
- Heavy rainfall
- Hail
- Severe turbulence
- Tornadoes





One year global lightning event density map using GLD360 cloud-to-ground stroke and cloud flash data from 1 July 2011 through 30 June 2012. The color legend is located in the lower left corner of the image showing lightning event density values in units of events per square kilometer per year. Pink represents the highest lightning event density values and gray represents the lowest lightning event density values

Thunderstorm and Lightning Costs

Globally, lightning causes approximately 24,000 casualties every year. Accurate airport-related statistics are virtually non-existent, but the reported 92 injuries and one death between 1991 and 2011 clearly represent only a small percentage of the actual number of incidents.

However, the high human and financial cost of accidents is well known. A study by the FAA estimates that the financial cost of an air-taxi accident often approaches ten million USD, with an air carrier accident cost easily rising to over a hundred million USD.

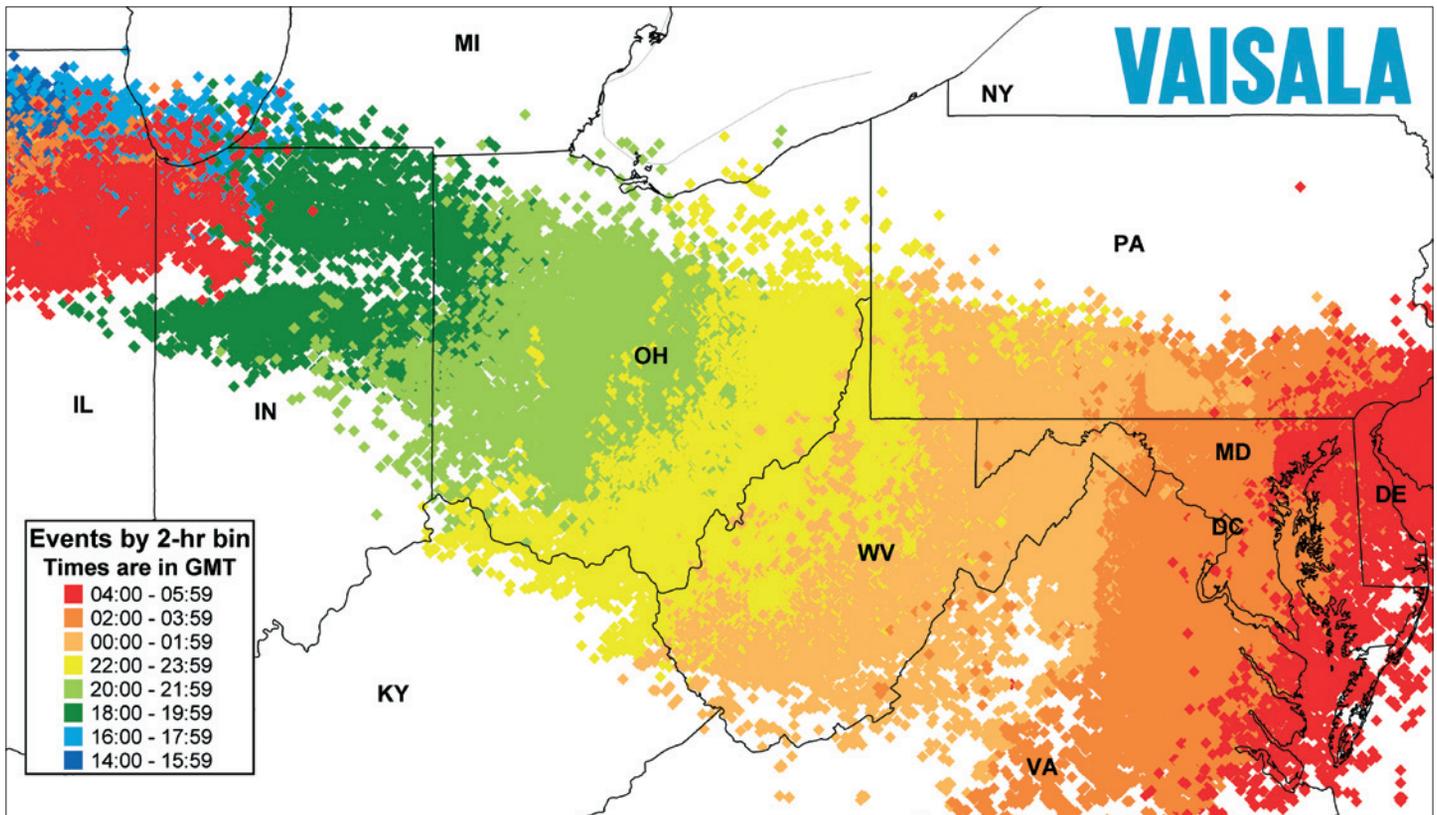
Vaisala Global Lightning Dataset GLD360™

The GLD360 data is produced by a global lightning detection network consisting of sensors installed around the world by Vaisala. Breakthroughs in lightning waveform recognition at extreme distances as well as in sensor sensitivity allow the GLD360 network to produce unmatched, near-uniform high performance lightning detection on a global-scale.

GLD360 provides $\geq 70\%$ cloud-to-ground flash detection efficiency and $\geq 5\%$ cloud flash detection efficiency with a median cloud-to-ground stroke location accuracy of 2-5 km. To ensure

the GLD360 network meets these high performance specifications, continuous stringent validation studies are being performed in North America, South America, and Europe. The results show that GLD360 meets or exceeds the required specifications in all three regions. The performance of the GLD360 network is continuously monitored and improved.

ALIS Applications



Map showing GLD360-detected lightning events within a long duration severe wind event (known as a derecho) that affected the northeastern United States. Over 230,000 lightning events are color-coded according to the time they were detected from 1400 UTC 29 June to 0600 UTC 30 June 2012. As shown in the legend located in the lower left portion of the picture, lightning event colors correspond to 2-hour time intervals starting from 1400-1559 UTC June 29 (dark blue) and ending at 0400-0559 UTC 30 June 2012 (red).

ALIS Application for Low Level Windshear

Thunderstorms even tens of kilometers away can send straight-line wind-shear events (gust fronts) through the airport. The Vaisala ALIS service issues low-level windshear watches for Air Traffic Controllers to improve situational awareness when lightning occurs within 30 km of an airport. The windshear watch can also be used to complement Vaisala AviMet® Low Level Windshear Alert System (LLWAS) to expand coverage beyond the aerodrome.

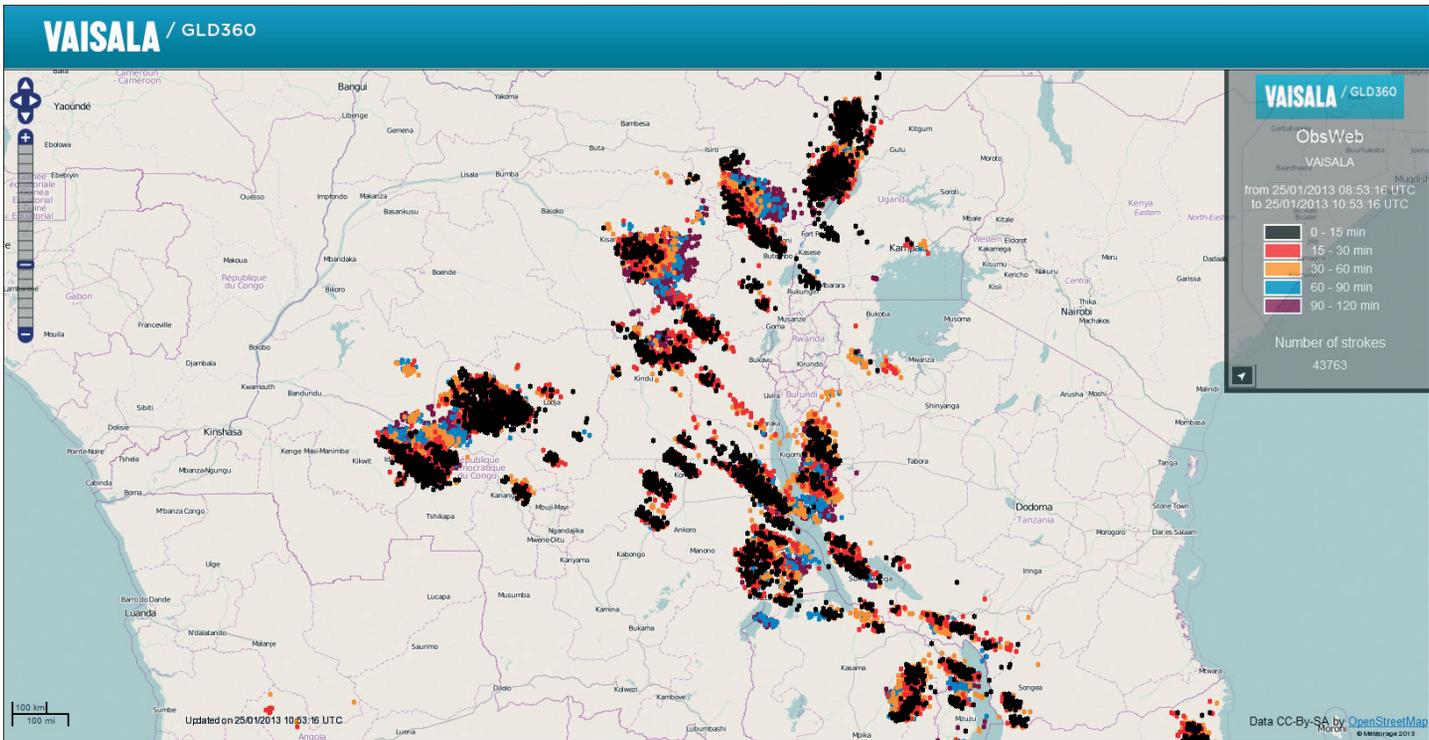
ALIS Applications for Present Weather and Cloud Type Reporting

Fully compliant with the International Civil Aviation Organization (ICAO) requirements, Vaisala ALIS issues present weather thunderstorm alerts when lightning is within 5 nm (9 km) or 10 nm (19 km). These alert radii are specifically designed to help meteorological observers better understand when to enter the “TS” or “VCTS” present weather code within METAR, SPECI, and local reports. The 5 nm (9 km) alert also helps the meteorological observer better understand when to report the “CB” cloud type in METAR, SPECI, and local reports.

ALIS Application for Cloud-to-Ground Lightning Warnings

Thunderstorms produce dangerous cloud-to-ground lightning that can cause injury or death to ground operations personnel during loading/unloading and refueling. The Vaisala ALIS service issues cloud-to-ground lightning warnings based upon customer-selected warning criteria. The customer can maximize safety and operational efficiency by adjusting:

- Warning radial distance from the airport
- Warning expiration time



ALIS web-based lightning display showing two hours of lightning activity within south-central Africa on 25 January 2012.

Vaisala offers research experience in airport lightning warnings that spans over a decade to help customers make well-informed decisions when trying to optimize airport lightning warning performance.

ALIS Application for Airplane Terminal Approach

Air traffic controllers can use the ALIS web-based display to help pilots avoid flying through hazardous thunderstorms in the terminal approach area and avoid severe turbulence, windshear, hail, and natural/airplane triggered lightning strikes to airplanes.



ALIS Features and Data Specifications

Features and Data Specifications

Vaisala ALIS, powered by GLD360, immediately provides the customer with the following data and features:

- GLD360 near-precision network lightning data subscription covering a 500 km radius from the airport
- Web-based lightning display by Météorage that is accessible via PC and smart phone
 - Pan/zoom capabilities
 - Airport-level map display, including runways
 - Time color-coded lightning events to assist with thunderstorm identification and tracking
- On-screen, text message, and email alarms by Météorage:
 - Using radii at 5 nm (9 km) and 10 nm (19 km) to assist meteorological observers with "TS" and "VCTS" present weather and "CB" cloud type reporting
 - Using a radius at 30 km to issue low level windshear watches for air traffic controllers
 - Using a customer-configurable alarm radius distance to issue cloud-to-ground lightning warnings to protect ground operations personnel responsible for loading, unloading, and refueling from dangerous cloud-to-ground lightning
- Alarm historical archive available via web-display
- 24/7 customer support by Vaisala Help Desk
- Delivered to customer within two weeks from the receipt of order

GLD360 specifications:

- $\geq 97\%$ detection of all thunderstorms producing at least three lightning flashes within 500 km of the airport
- $\geq 70\%$ cloud-to-ground flash detection efficiency
- $\geq 5\%$ cloud flash detection efficiency
- 2-5 km median cloud-to-ground stroke location accuracy
- Triplicated archive of all global events detected since 1 January 2011
- Duplicated central processing servers
- 24/7 monitoring for quality assurance by Vaisala experts

How to Get Started

It takes only a few simple steps to a fully functional service. All you need to provide is basic information that includes (1) airport location, (2) your customer-specified alarm radius for the one radius that is not pre-defined, (3) email address and cell phone numbers to receive lightning alerts.

Once we have received the information and the payment for a 1 or 5-year contract you will receive all you need: Web display showing GLD360 lightning data within 500 km of the airport and on-screen, email, and text alerts when lightning is within the determined distances of the airport. The ALIS also gives you web-based access to an alert history page where all historic alert start and stop dates/times can be found.

Improving safety and efficiency could not be more reliable, simple or affordable. Now you can get the world's leading lightning detection system without investment in hardware or maintenance, delivered to you by the global leader in aviation weather and lightning solutions. Let's talk more.



About Météorage

Founded in 1987, Météorage owns and operates the French Lightning Detection Network. Météorage offers a wide range of real time and archived lightning data services tailored to suit the needs of an extended customer base. Today, hundreds of customers throughout France, the United Kingdom, and Switzerland use the services developed by Météorage on a daily basis. Météorage is partly owned by Vaisala.



Vaisala – The Knowledge Company

Experience Counts

With over 1500 installed ICAO and FAA certified aviation weather solutions covering all airport sizes in over 90 countries, we have the technology, experience and contacts to provide solutions for all kinds of airports, anywhere.

In lightning detection, Vaisala leads the industry with over 40 years of experience. As of 2012, we have delivered 90 precision lightning detection networks in over 45 countries around the world. **And Vaisala remains decades ahead of the competition.**

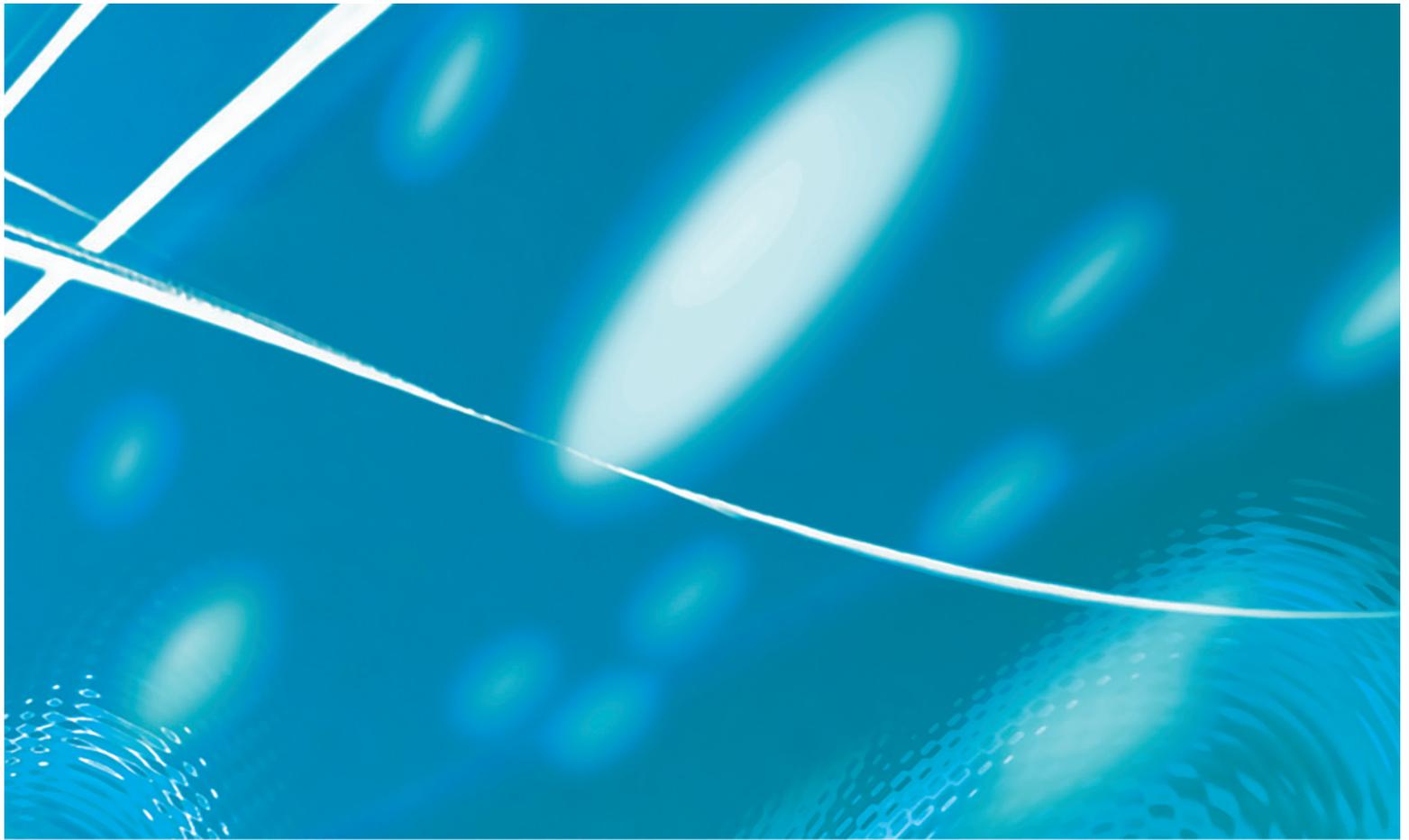
The United States National Lightning Detection Network (NLDN) has been built, owned and operated by Vaisala since 1989. The NLDN is the most validated and referenced lightning detection network in the world with over 1,000 scientific references.

Vaisala has also built, owned and operated the lightning detection network that produces the Global Lightning Dataset GLD360™ solution (2009–). The GLD360 is the only solution providing near-precision lightning detection network data everywhere in the world.

Vaisala is a global leader in environmental and industrial measurement and continues to raise the global standard for lightning detection.

Curiosity, the desire to meet challenges and an extraordinary ability for innovation are at the heart of the company – both past and present.

Curious? Learn more about Vaisala at vaisala.com



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www.vaisala.com

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