VAISALA

NEWS

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VAISALA NEWS

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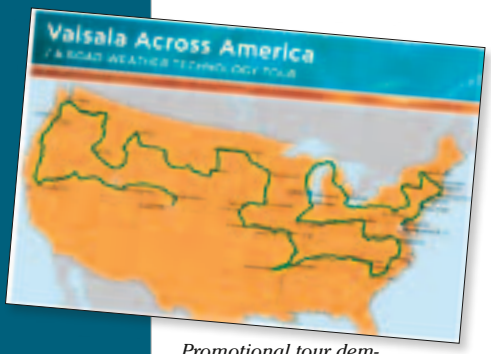
Vaisala in Brief

Vaisala is a global leader in environmental and industrial measurement. Building on 75 years of experience, Vaisala contributes to a better quality of life by providing a comprehensive range of innovative observation and measurement products and services for chosen weather-related and industrial markets. Headquartered in Finland, Vaisala employs approximately 1,400 professionals worldwide and is listed on the NASDAQ OMX Helsinki stock exchange.



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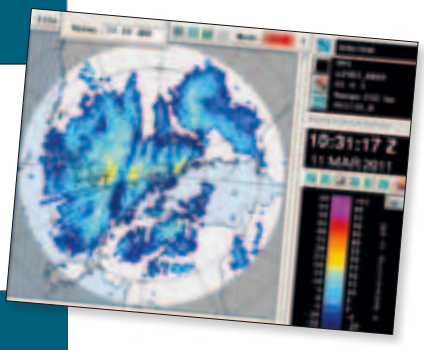

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Technology Got Us Here

– But Where Is It Taking Us?

Technology has had a profound impact on the environmental sciences. During Vaisala's long history we have witnessed first-hand the evolution of breakthrough technologies in observation-based weather forecasting that enabled the shift from crude, hand-drawn weather maps to modern numerical prediction models. In quite a few cases we played a central role ourselves.

We've also seen – and contributed to – the development of the use of measurement technologies in industrial environments. One of the undisputable highlights for us was the development of a new polymer-based humidity sensor, which not only revolutionized the accuracy of humidity measurements in radiosoundings, but also paved the way for Vaisala to grow into the leader in industrial humidity measurements.

Starting from Vilho Väisälä and his first radiosonde, technological leadership and innovation have been something of a company policy for Vaisala. It has cemented a foundation on which new elements have later been built.

Such as? Customer-focused thinking, for one. The only way to make sure that the technologies and innovations we develop truly meet our customers' needs is to understand their business, applications and ambitions.

The usability of products and systems, application software, intuitive user interfaces – all these are just as important today as pure sensor technology once was, and innovation in these areas is not possible without understanding what is important to the customer. Decision-support systems for our road, airport and energy customers are a great example of such a development.

Another area that is quickly gaining in importance is services, which we have invested in to respond to a direct customer need. Service offering like lightning detection data, new weather systems as a service type of concepts and our online store for industrial instruments, for example, have moved us beyond basic repair and calibration services towards a position where we can offer real added value to the customer.

We haven't by any means given up on pursuing technological leadership, it remains one of the driving forces for Vaisala. But the single most important driver for us is our customers and the needs of their demanding meteorological and industrial applications – past, present and future.

Vaisala Across America!

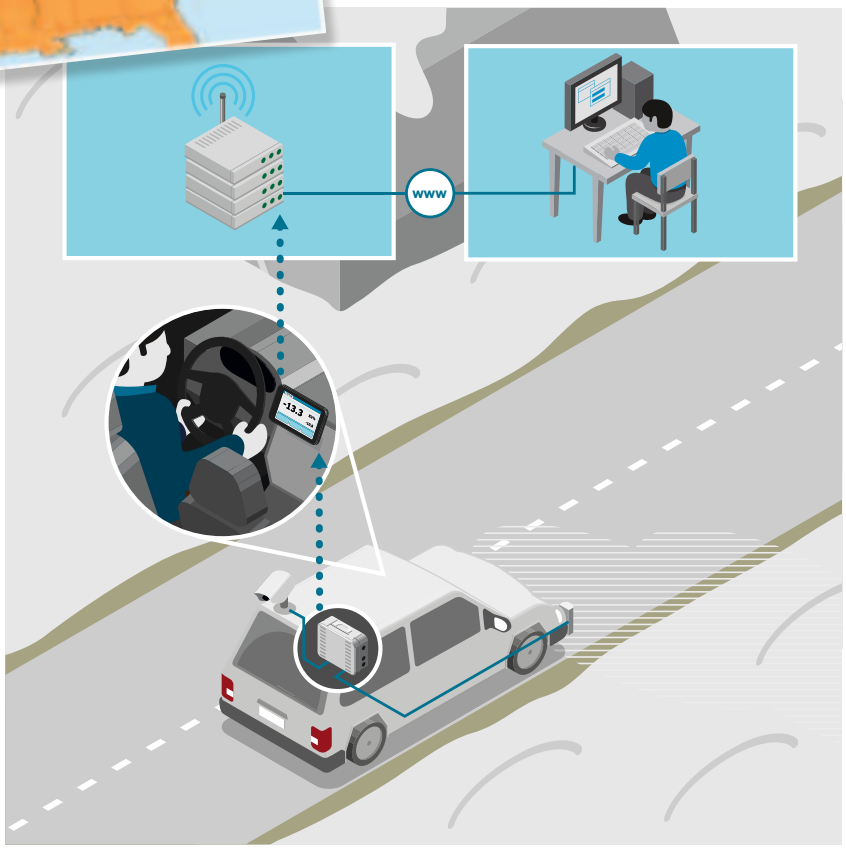
One car. One Vaisala Condition Patrol DSP310 system. Sixteen weeks. 18,325 miles. Promotional tour for Vaisala's new mobile road weather system demonstrated the new technology to road maintenance professionals and the general public across America.

The tour began on February 1 at Vaisala's U.S. headquarters in Louisville, Colorado, and ended May 21 over 18,000 miles later in National Harbor, Maryland. In addition to introducing Vaisala's latest technology advancements to customers, the tour was a chance to show the general public the tools that have been developed to help keep them safe on the roads.

Throughout the tour, Vaisala's Marketing Manager **Jon Tarleton**, Application Manager **Tony Coventry**, and Sales Managers **Daniel Boop**, **Bert Murillo** and **Brent Cobb** kept a blog to document the journey. Here

The tour covered over 18,000 miles from Louisville, Colorado to National Harbor, Maryland.

Condition Patrol allows data to be viewed on a smart phone in the vehicle or brought back to Vaisala's road weather software for remote access.



are a few tidbits from along the way – for a full recap, visit the blog at http://mobiletour.vaisala.com.

January 16, 2012

The Vehicle Has Arrived

"Today we received the vehicle that is going to be at the heart of the Vaisala Across America tour. Over the 16 week tour the truck will be passed to all six sales manager in our Roads business group, who each will have the truck for about 3 weeks as it travels from coast to coast. We nicknamed the truck *Vaisala One*."

January 26, 2012

It's All About the Sensors

"The Condition Patrol DSP310 units arrived in our office on Monday. Installing the system in the vehicle was easy and fast. Our tech Tim Nicoll spent about three hours installing it, but that was primarily due to this being our tour vehicle. He wanted to route the cables so they will not be seen or tripped over by people getting in and out of the truck, so he spent a lot more time working on the look than actually installing the system. Tim thought that if we were a customer installing this, he would not expect it to take more than an hour. Tim was pretty excited how easy it was to set-up and configure. 'This thing works right out of the box!' he exclaimed. We were all a bit proud of that comment, because that was one of the key goals during product development."

February 2, 2012
It's All About the Information

"Yesterday the Vaisala Across America tour began as the truck left our headquarters at about 3 p.m. Mountain Time. As we watched the truck drive off, we were all excited and a bit sad. Sad to let something go that was so cool to us, but excited in what laid ahead. Throughout the afternoon and evening we watched the tour website as the first sales manager drove north to Wyoming. As he called me late in the day to report in, he said 'Jon, I am almost in Wyoming.' I sort of jokingly replied 'Jerry I know, I am watching you drive.'"

February 3, 2012
What a Response

"Wow what a week! When we first kicked around the idea of a national tour we never expected the response we have received in three short business days. The response has been wonderful! At our first stop the customers were so excited they had us drive down the road behind them as they performed their pre-treat activities before a winter storm coming on Friday. They saw how the system quickly detected the dry road turn wet and showed it on the system display. – At our next location, the customer did a similar test by having us drive into their garage. They sprayed water on the ground and saw how quickly the in-cab display showed a wet pavement. As the first week ends we know the fun (and work) is just beginning."

February 7, 2012
A Trip or a Journey

"John Steinbeck wrote in the novel *Travels with Charlie* that, 'We find after years of struggle that we do not take a trip… a trip takes us.' As I landed in Salt Lake City and saddled into Vaisala One to continue its newly begun journey across the country, I was compelled to contemplate what he meant. – As the sun set the temperature began to drop and eventually the pavement temperature began to drop until the screen flashed red as it fell below 32 degrees indicating moisture on the road could turn to ice. And then I realized… This is why we are out here; this is the meaning of our tour across America. This is the information that road maintenance crews across our nation use to keep our roads safe and clear."

February 21, 2012
On the Road Again

"Heading east catching a Washington State Ferry from Kingston across the Puget Sound, I was a little amused that the DSP310 sensors were reading dry all the way across the sound even though we were completely surrounded by water, and it was raining. A random stranger did not believe the sensor would detect ice while waiting for ferry. He poured out his slurpee right under the sensor. Changed to ice. That's why there is a red dot in Kingston. Hilarious. People were standing around amazed. But as the ferry arrived and we drove off the massive ship the sensors quickly changed to wet signifying we had arrived in Seattle."

February 24, 2012
Road Science Class

"As Vaisala One was driving through the mountain pass just east of Missoula, MT it began to snow relatively heavy. The Condition Patrol interface display was showing the pavement as wet, however the pavement temperature was below freezing and I thought, 'how could this be?' The road should be frozen and covered in ice. And then I realized the road

maintenance crews must have pretreated the road in anticipation of this weather event. There were chemicals on the road that lowered the freezing point of the moisture on the road. Traffic was safely moving at 60 mph through this mountain pass that if left untreated would most likely be impassable."

March 8, 2012

Off the Beaten Path

"The combination of relatively mild winter weather in the northwest, and really well maintained interstates, have left the Tour Across America with limited opportunities to demonstrate the DSP310's unique ability to sense, log, and deliver data about snow, ice, slush, and wet conditions as it is designed to do. So we decided to go looking for it… –

Bert decided he was going to get off the interstate and take State Route 21 through the mountains. I was a little nervous because I had heard about that pass this time of year, and by the time we'd get there it might be late and who knew what the pass would be like. As we reached the pass it was snowy and icy as expected. Not surprisingly, even in the dark the DSP310 sensors told us about the snow and ice on the road. The display flashed a warning to us about the reduced grip, so we slowed down to cross through the treacherous pass safely."

April 12, 2012

A Southern Spin

"The Vaisala Across America tour continued its trek south of the Mason Dixon Line in search of some winter weather in the mountains of western North Carolina, and in similar fashion to the first legs of the tour no winter weather was to be found. – Because of the geographic location of the Carolinas, straddling the line where snow and ice can be prevalent, the relevance of real time weather data is very significant. A solid RWIS program, and the information it provides, is crucial to the maintenance operation planning for forecasted winter weather events that may be approaching. The DSP310 Condition Patrol should be a vital asset to that winter maintenance program, particularly in southern climates that can experience a great deal of temperature variance."

May 1, 2012

What an Event!

"We just finished the American Public Works Association's (APWA) North American Snow Conference here in Milwaukee, Wisconsin. – It was one of the best that I have ever attended. With the largest exhibit floor ever, and a very strong attendance, it was a huge boost to our team. What I love so much about this event every year, and it pretty much is the only trip I look forward to traveling over the weekend, is being around such great people. The public works community and state highway professional are some of the nicest and friendliest folks you can ever run across.

And Vaisala One? Never looked better. The three days at the snow conference were the longest the tires on the truck had not moved. It received a huge response from the attendees. Our group talked to countless cities, counties, and states on how they could use our new technology in their operations."

May 25, 2012

Sun Sets on the Tour Across America

"It's been a long but rewarding 16 week tour, travelling across the country visiting with our customers, partners, and friends along the way; all while capturing hundreds of thousands of database records of road temperatures, conditions and friction readings with their exact time-stamped GPS location. After arriving in National Harbor, MD just across the Potomac from our Nation's Capital in time for the 2012 ITS America Annual Conference, a long exhaling sigh escaped as we watched Vaisala One roll on to the showroom floor. Battered and scarred from the 18,325 mile journey, she seemed to smile back at us with her own sense of relief. We made it!"

For full blog, measurement results along the route and other information, go to http://mobiletour.vaisala.com.

Vaisala Condition Patrol DSP310 – First-of-its-kind solution for Road Weather Maintenance Professionals

The Vaisala Condition Patrol DSP310 uses first-of-its-kind technology to provide road weather maintenance professionals with a complete mobile solution to monitor their road network. The system collects the data and displays it on a smart phone on the dashboard of the vehicle. The data can also be brought back through the phone's mobile network to be displayed in Vaisala's road weather management software for the viewing of others in the agency.

Mobile weather data provides road weather maintenance with important information about road conditions wherever they drive, filling in gaps between fixed weather station data, and providing data on the go. The more complete information helps road maintenance departments make better decisions that will reduce costs, protect the environment, and improve safety on the roads.

Sorting Out Wireless

Choosing the connectivity that will allow sensors to speak to a central processing unit is one of the most complicated decisions in selecting an environmental monitoring system for FDA/GxP regulated industries. One way to go is wireless.

Monitoring systems for temperature, humidity and other parameters continue to proliferate in FDA/GxP regulated industries, which has made selecting a monitoring system no easy task. The systems can become complex, sometimes involving hundreds of sensors in a variety of settings, and anyone involved in these projects will have to make many complicated decisions.

One of the most complicated ones is selecting the connectivity that will allow the measurement devices to speak to a central processing unit. Decisions on connectivity will depend on the importance of the data for regulatory purposes as well as logistical concerns such as the placement of access points for transmitters.

Three different ways to achieve connectivity

The most common methods of connecting the sensors to a monitoring system are using fully wireless devices, hardwired devices or hybrid devices. Wireless devices run on batteries and transmit data wirelessly via radio frequency to a receiver while the hardwired ones are powered by permanently installed electrical connections and transmit their data over wires. Hybrid devices are hardwired to a power source, but transmit measurement data wirelessly.

Fully wireless devices are easy to install and can be the most economical option for a facility that

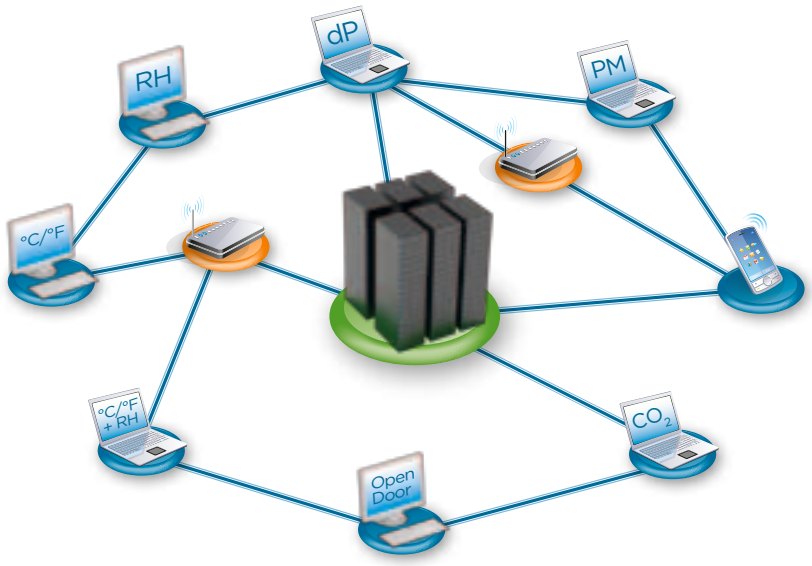
does not have convenient sources of power at the monitoring points. The biggest downside is the need to change the batteries. If there are only a few sensing devices this is not a problem, but when the number of devices increases, staying on top of battery management can become a substantial task. Also, devices in high risk areas where the measurement intervals are shorter tend to run through batteries more quickly.

Hardwired devices sidestep the issue of batteries and all issues related to RF communication. Many consider them the "gold standard" of reliability. The main downside to hardwired devices is the time and cost associated with running wires for power and signals. Power over Ethernet (PoE) can simplify installation by providing both power and communications in one cable, which is typically a CAT5 cable that is connected to a PoE enabled server.

When planning the installation of any hardwired device, it is important to consider the power source and what might happen to the monitoring devices and system in the event of a power outage. If the power source is not backed by generators, it may be wise to provide an uninterruptable power supply (UPS) for devices that are monitoring critical areas. PoE devices get their power from computer servers that are usually backed up with generators or large UPS systems.

Hybrid devices come in many flavors. They may transmit data wirelessly but be powered with internal battery backup. A battery-powered device that also has on-board memory can ensure that data is recorded autonomously and continuously even during power failures or extended blackouts.

Hybrid devices are versatile and can be used to create workarounds for challenging situations. It is possible to combine hybrids with different configurations on the same monitoring system (e.g. some wireless, some PoE, some fully wireless). The downside to hybrid devices is the extra care necessary to specify and implement a system correctly. Hybrid devices may also be slightly more expensive than simpler devices.



Just as one system can monitor multiple parameters and provide multiple outputs, such as reporting and alarming, multiple modes of connectivity can be used to customize a system to suit each application.

What Does Wireless Mean, Exactly?

When considering going wireless, it is important to distinguish between power supply and signal output because the term "wireless" can apply to both. This applies to all environments, whether monitoring warehouses, stability rooms, or freezers.

Power supply is simple; a device is either connected by wires to a source of electricity or it runs on batteries. Signal output is more complicated; wireless can be any method of communication that literally does not use wires. This is typically done over radio frequencies (RF).

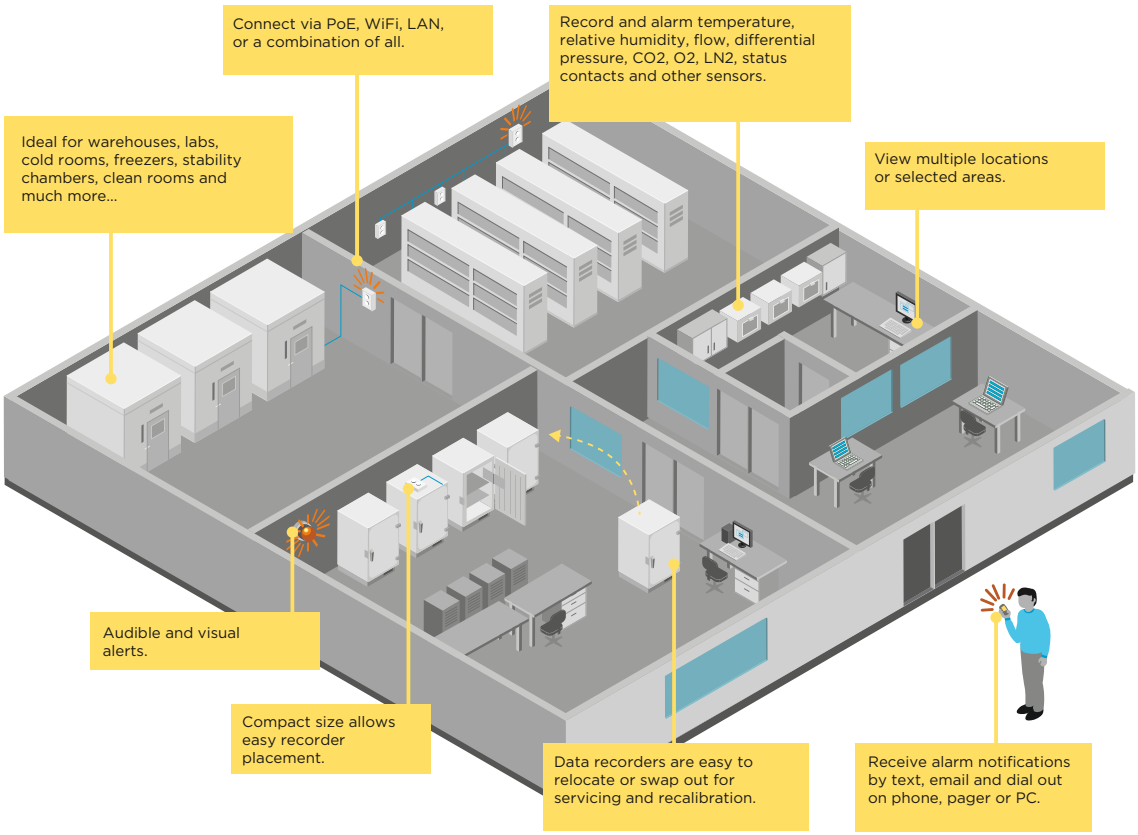
There are different frequencies and data formats to choose from. The two most common are WiFi and "other." WiFi is familiar to most people because it is a common computer network protocol. If the facility is already using WiFi, it can be convenient to run the wireless monitoring system over the existing infrastructure. What's more, WiFi protocol is a global standard, assuring that most WiFi equipment are interoperable.

The somewhat vague category of "other" refers to systems that use standard or proprietary protocols and operate on a variety of different frequencies. These systems have some benefits, e.g. they can be designed to operate over longer or shorter distances than WiFi and do not have to share any existing networks within the facility. However, these systems require their own network of radio devices.

If the monitored areas are spread out in the facility, many of these devices are needed. If a WiFi network already exists, it may not be necessary to create an entire new network. It is also good to remember that proprietary RF networks may have less flexibility or be incompatible with regulations in other parts of the world, which limits the ability to create global monitoring networks in widely distributed locations.

Upside, Downside

While the reliability of wireless systems is debatable, a wellconfigured system combined with good



Vaisala's continuous monitoring system can be customized for an enterprise-wide solution. Connectivity options include Power over Ethernet with vNet PoE connectivity cradle, wireless via 802.11b Ethernet interface, standard or multiport ethernet, or direct to PC via USB.

hardware will contribute greatly to data integrity and security. However, even the best wireless system can be compromised in two ways.

First, all radio devices are subject to interference from other devices that create electromagnetic radiation (EMR). Obvious sources are hand-held radios and cordless phones, less obvious ones microwave ovens and large electric motors.

Second, the propagation of RF signals can be limited by physical obstacles, such as walls, racks full of products, and large metallic objects. These barriers to transmission can be taken into consideration during the planning, installation, and testing of wireless devices, but it's important to remember that the physical configuration of an area may not be the same in six months' time. This is especially true in large spaces used for storage or other activities that change regularly.

Eight Key Considerations

There is no one single best way to configure connectivity in a monitoring system. However, there are eight key considerations that help to decide which method is the most suitable to a specific environment.

1. Number of devices in the system (complexity)
2. Quality and performance of devices (accuracy of measurements; reliability)
3. Nature of the space where monitoring is required (small chamber, research lab, warehouse, etc.)
4. Existing infrastructure (electrical power, presence of WiFi, and Ethernet data drops)
5. Human resources required to install the envisioned system (running wires; happens once)
6. Human resources required to maintain the envisioned system (battery changes, happens regularly)
7. Desired and/or required data integrity (some data gaps OK vs. gap-free data)
8. The requirements and preferences of other system stakeholders (Quality, Information Management)

The need for monitoring systems is often driven by a combination of regulatory pressure and risk analysis. Most regulatory bodies provide guidance on what needs to be monitored while the risk analysis helps to define the criticality of specific measurements and events, and what they mean to each organization.

Further information:
www.vaisala.com/lifescience

Sanna Nyström / Editor-in-Chief /
Vaisala / Helsinki, Finland

More in Store

Vaisala Online Store open in 44 countries.

First launched in January 2012 in 8 European countries, the Vaisala Online Store for industrial instruments has grown at fast pace, both in terms of product offering and geographical reach. It now comprises close to 200 instruments, spare parts and accessories, and serves customers in 44 countries worldwide.

"We wanted the store to provide another world-class customer experience to complement our existing sales channels. It is directed to customers who know what they need and appreciate a convenient and easy channel that is always available. Our local sales experts continue to serve more complex needs," says Lauri Tuomaala, Director for Vaisala's Controlled Environment Sales.

"The online store is all about functionality and convenience: 24/7 availability, the ease of finding the right product, a hassle-free and secure payment, and a reliable delivery process. Buying an instrument doesn't get any easier."

Non-Stop Availability, Top-Notch Functionality

The store carries a selection of Vaisala's industrial instruments, ranging from hand-held meters to configurable transmitters. The latest additions include the recently launched Vaisala HMW90 Series HUMICAP® Humidity and Temperature Transmitters and the Vaisala HUMICAP® Structural Humidity Measurement Kit SHM40, for example.

But the store is more than just a shopping catalogue. Advanced functionalities, such as a smart Product Finder, help the customer quickly find the most suitable product for his or her needs. Up-to-date documentation and user guides are also easily accessible for fully informed purchase decisions.

A live chat feature that allows the customers to contact Vaisala's customer service team by instant messaging offers additional support.

Work in Progress

From the start, two things were certain: the store would be continuously developed further, and the number one factor to drive this would be the customers' shopping experience.

"When building an online store of this magnitude from scratch, the reality is that you have to start from somewhere. We built the store based on certain assumptions on product offering and services with the idea that those would be re-evaluated when we have actual customer feedback," says Henri Kaukola, Project Manager in charge of the store's development.

"This has turned out to be the exact right philosophy. Since the launch, comments from customers have helped us enormously in developing the store further. For example, we have added payment options and expanded product selection based on customer feedback. I hope our customers keep on sending us feedback in the future as well."

High Winds and Sand Dunes

Expanding Germany's Autosonde Network

Deutscher Wetterdienst was among the first major meteorological organizations to order a newly developed Vaisala autosonde system in the mid-1990s. After a recent upgrade and expansion, they now have a network of systems across Germany, including installations in some atypical environments.

Today the fully automated Vaisala DigiCORA® Unmanned Sounding System AUTOSONDE is an integral part of many national upper-air networks, but in 1996, it was still brand new. Having had previous experience with semi-automatic systems for ships (ASAP), Deutscher Wetterdienst (DWD), Germany's National Weather Service, was one of the first to order a system for testing.

The first system fulfilled all expectations, leading to permanent installation of the test system as well as two new orders. The first system was installed in Essen, where it replaced a manual sounding station. The two new systems were installed at an airport in Halle/Oppin and at an existing weather station site in Stuttgart. Later the Halle system was moved to Oberschleißheim, near Munich.

The three systems were combined into a network providing full automatic data transfer to all data users, and allowing remote monitoring and operation from different DWD sites when needed. Over the years, the system software was regularly updated to adapt the system to new WMO message coding and to provide additional features, for example.

In 2010, DWD decided that it was time to renew the three existing autosonde systems and to expand the network by two additional ones. After a Europe-wide tender process, Vaisala was chosen to supply five new Vaisala AUTOSONDE systems. The order also included an option for a sixth system to be used as a technical support system for training, software testing and possible fault analysis.

Adjusted to Customer Needs

The first new system was installed on the island of Norderney in the North Sea. Several new features were adapted specifically to DWD's needs, including comprehensive data quality monitoring and data security and access to DWD's strictly controlled wide area communication network.

Due to Norderney Island's strict environmental regulations the autosonde container had to be painted in a specific yellow colour.

Technical status monitoring was also added by providing a remote monitoring option that allows technical staff to see the status of each system easily using a web browser and to receive alarms in case of any irregularities.

In addition, modifications were made to fulfill many operational and safety requirements, such as German standards for electrical safety, fire prevention and protection, cabling and grounding regulations.

Environment Sets Its Own Requirements

The entire eastern half of the Norderney Island belongs to the Wattenmeer National Park, which means that local environmental regulations were stricter than usual to protect the island's wildlife. For example, the autosonde system container had to be painted in a specific color, and noise emissions had to stay below strict limits.

Wind and sand proved another challenge. As the chosen location was on dunes near the coast of the island, preparing local infrastructure prior to installation needed more work than usual. It included, for example, installing a steel platform as a foundation for the autosonde container that was designed considering the sand drift and high winds that can be expected on the dunes.

Also, a new wind mast was erected as a part of the autosonde system to hold wind sensors and other equipment for an automatic weather station. The station provides ground observation data and controls the wind covers of the autosonde launcher.

Most Advanced Autosonde Network Completed Next Year

All installed systems are based on the very latest version of the Vaisala DigiCORA® Unmanned Sounding System AUTOSONDE. Compared to the previous product versions many improvements have been implemented. For example, the control system of the pneumatic robot launcher has been redesigned and includes latest state-of-the-art technology. Improved versions of air compressor and air conditioning systems are also in place.

Besides Norderney, a new system has already been installed in Meiningen, and the three existing autosonde systems will be replaced with new ones by 2013.

Further information:
www.vaisala.com/soundings

A Year of Success for Vaisala's Accredited Calibration Laboratories

Vaisala's accredited calibration laboratories make sure the products measure throughout their lifetime just as well as they did on day one.

As equipment ages and undergoes temperature changes or sustained mechanical stress, its performance will start to suffer. Calibration – the comparison of a device's performance against a standard of known accuracy – keeps the device working as accurately as possible. Vaisala has provided traceable calibration services for over 50 years, from two liquid-in-glass thermometers calibrating radiosonde ground check equipment in Finland in 1958, to today's state-of-the-art laboratories in Europe, North America, Japan and China.

The laboratories offer tools and services to help keep humidity, dew point, carbon dioxide, and temperature instruments calibrated accurately. Accredited services are performed with rapid turnaround times by a dedicated team of experts, fulfilling ANSI Z540.1, ISO 17025, and ISO 9001 requirements for competence in calibration laboratories. The laboratories use these requirements to implement a quality system aimed at improving their ability to consistently produce valid results.

30 Years of Accreditation in Helsinki

Technical Manager Antero Pitkäkoski has devoted more than 30 years to ensuring that Vaisala's commitment to quality measurement is the best in the industry. Thanks to him, the Measurement Standards Laboratory (MSL) in Helsinki was one of the first laboratories in Finland in 1978 to apply for third-party recognition of its calibration activities.

In 1983, when the laboratory authorization system was launched in Finland, MSL received the first authorization for pressure calibrations. This was followed by temperature in 1986 and humidity in 1995. In 2011, the MSL was assessed by FINAS, the Finnish national accreditation body, and proved their long tradition of providing high accuracy calibration services by passing their renewal. MSL currently carries out approximately 3,800 accredited, laboratory and service calibrations a year.

Heli Järvinen, team leader at MSL, is very pleased with the results of the recent accreditation renewal. She asserts that when you commit to accreditation you must build a system with fixed requirements, and then maintain it so that those requirements are constantly fulfilled. This has been routine for MSL since 1983.

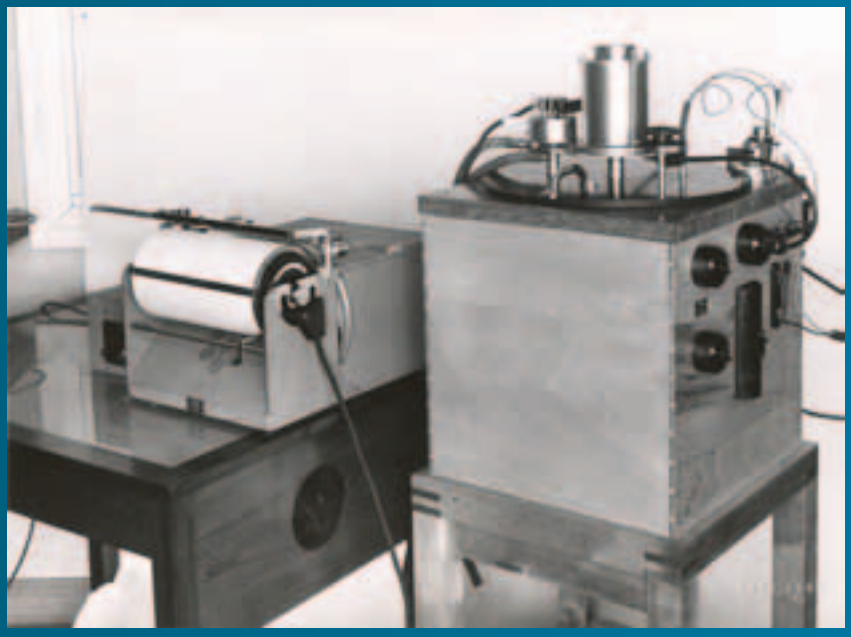
"In the last renewal the assessor from FINAS gave us positive feedback about our development work," Heli Järvinen says.

"They said that it is great to see how year after year we are able to develop our calibration operations and documentation as an accredited laboratory."

The laboratory is also striving to develop further.

"Currently we have four automated temperature calibration stations and two automated pressure calibration stations," Järvinen says.

Calibration equipment for calibration of four radiosondes at a time, 1939.



Radiosonde calibration in the 1960s.

"During this year we will replace our primary salt-solution station with a primary relative humidity calibration station, which also will be fully automated. Our gas flow calibration station will also be updated."

Optimal Adjustments from Boston and Vancouver

In December 2011, Vaisala's Calibration Standards Laboratory (CSL) in Boston had their accreditation renewed, with an expanded scope to cover pressure calibration as well as field service humidity and temperature calibration. The assessor, from the awarding body A2LA, commented that he has assessed 84 laboratories and Boston's uncertainty budgets were the best that he has ever come across.

Michael Boetzkes is Quality Manager of Vaisala's Calibration Standards Laboratory in Boston, and Technical Manager of CSL Vancouver. He stresses the importance of high-quality calibration and explains that, "as the manufacturer of the equipment, Vaisala is in the best position to perform optimal adjustments to the units. We can also more easily recognize early warning indicators to help avoid upcoming failures, and are best able to make any repairs or upgrades."

The Vancouver lab also had their accreditation renewed in 2011, and have now been accredited for a total of nine years. It is a very busy laboratory, performing approximately 12,000 accredited calibrations a year. A typical day will see 30-50 units arriving for calibration.

"The team is very dedicated and customer focused," Boetzkes says. "They take a high level of pride in the work that comes out of the lab: accurate and arriving on time with the customer."

Only Highest Quality for Tokyo

Another Vaisala lab that had their accreditation renewed in 2011 was the Tokyo laboratory in Japan. Nobuo Inamoto is Service Depot Manager for the Tokyo laboratory, and his team performs accredited calibrations on roughly 60 units a year. Although the volume is quite small, maintaining accreditation is important as Japanese culture places great emphasis on quality. Vaisala's accreditation is independent evidence of the effort the company puts into maintaining the highest possible quality standards in calibration services.

There are only six accredited humidity calibration laboratories in Japan – making the Tokyo laboratory's 2011 Japan Calibration Service System (JCSS) assessment and their following the ISO/IEC17025 standards an achievement. Inamoto says he enjoys the excellent team spirit in his Tokyo lab, with everyone working

Enhanced Reflectivity for Dual Polarization Weather Radar

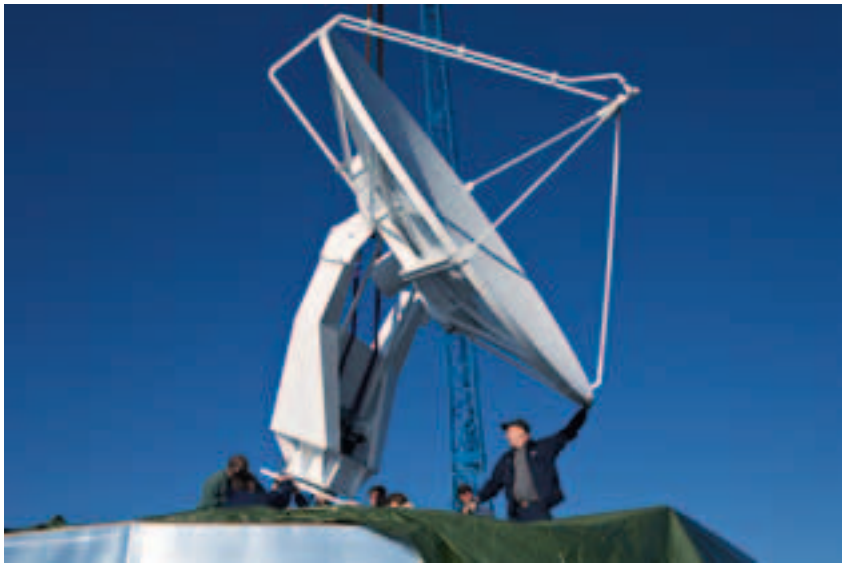
How to achieve increased sensitivity without the disadvantages of a more powerful transmitter?

With the first use of Radio detection and ranging (RADAR), it quickly became evident the technology was useful in surveying atmospheric conditions. With dual polarization significant effort has been made to improve the quantitative value of the radar measurement.

This article introduces a new signal processing technique to enhance reflectivity detection, improving the surveillance capabilities of a simultaneous transmit and receive (STAR mode) dual polarization radar. The technique improves the detection of low amplitude signals, common at distances farther than 150 km from the radar site. It is exclusive to Vaisala Weather Radar WRM200, Vaisala Weather Radar WRK200 and Vaisala Sigmet Digital Receiver and Signal Processor RVP900™.

Background

In order to make dual polarization radars cost effective, manufacturers choose to use the simultaneous transmission and reception (STAR mode) of the two polarization states. The STAR mode offers a simpler design increasing the reliability and lowering the lifetime costs of the system versus other dual polarization concepts.



The STAR mode also has a specific technical advantage that the horizontal and vertical data are sampled simultaneously. Therefore the STAR mode radar can achieve higher correlations with observed hydrometeors than other types of dual polarization systems.

A major disadvantage of the STAR mode is splitting the transmitter power into two channels. This effectively cuts the average output power of the radar by ½ or 3 dB. The amount of power received back to the radar is directly proportional to the transmitted power. When the transmitter power is cut in half the radar's minimum detectable signal is also reduced by half, thus some sensitivity is lost.

The traditional methodology to overcome this loss in sensitivity is to increase the transmitter power. However, higher transmit power does have important technical and economical disadvantages that need to be considered:

1. Increasing the transmitter output power also increases the amount of returned ground clutter power. This causes a need to use stronger ground clutter filtering algorithms. When ground clutter filter algorithms remove more data, they also negatively impact valid meteorological data.
2. Increasing the transmitter power increases the probability that

the receiver becomes saturated at near ranges to the radar site. With a saturated receiver distinguishing ground clutter from a weather signal becomes impossible.

3. The higher power transmitter has higher lifetime costs in the form of replacement spare parts, increased specifications to infrastructure like backup power generators and uninterruptable power supplies. The difference in a lifetime power consumption alone may be over USD 50,000 given today's cost of energy.
4. With higher power transmitters it may become more difficult to obtain a broadcasting license.

Increased Detectability Without More Powerful Transmitter

The amplitude of the received power is determined from the electrical voltages received through the antenna. These voltages are expressed as complex numbers in order to solve problems not possible with only real numbers. In weather radar signal processing correlations are performed by measuring the similarity of the received energy with itself. It is a mathematical tool for finding patterns, such as signals buried under noise.

Traditionally the power estimators used in dual polarization radars is to compare the horizontal antenna voltages with itself, or compare the vertical antenna voltages with itself. The output of these power estimators are then used to computer horizontal reflectivity, Z_h, and vertical reflectivity, Z_v, respectively.

The Vaisala solution to the problem of splitting power is to make use of a new input to the echo power estimation techniques. It is commonly known through the radar community that precipitating particles have a high correlation between the H and V polarization states. It is typical to have co-polar correlation ($_{\rho HV}(0)$) values greater than 0.85 for

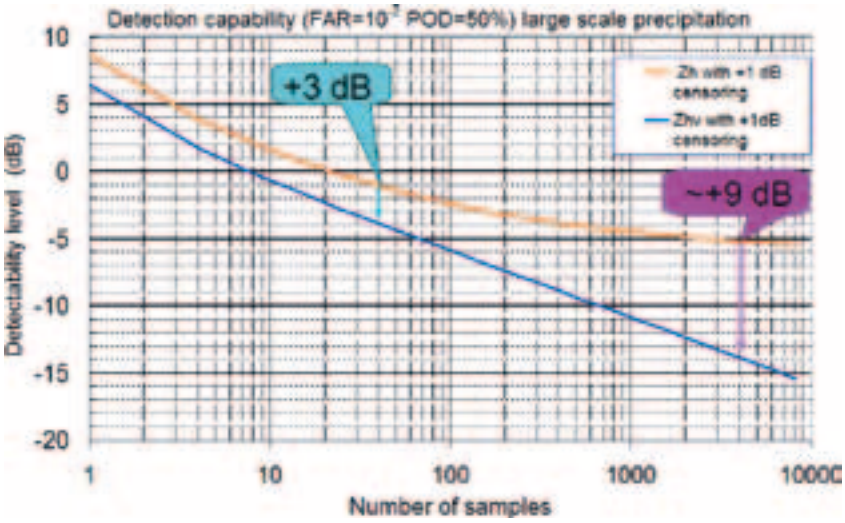


Figure 1 is a comparison of the detection capabilities of the Z_h and Z_{hv} power estimators as a function of samples when using data censoring techniques to remove residual noise. The difference between these two lines represents the increase in detection capability of the H&V power estimator over the H-only estimator.

almost every type of hydrometeor. In liquid rainfall it is common for the Vaisala WRM200 to measure $_{\rho HV}(0)$ at 0.996. Therefore it is just as feasible to compare the H channel antenna voltage with the V channel antenna voltage and call the resultant enhanced reflectivity, Z_{hv}. But why does this give better detectability?

The power returned to the radar is composed of energy from clutter, signal, and noise. There are many algorithms in use today to remove the clutter power, leaving us with the signal and noise power.

When obtaining the signal power, the traditional methodology simply subtracts the estimated mean noise value. The noise estimate comes from routine samplings performed during calibration or when the radar is operating. If we can lower the expectation value of noise and its variance, weaker signals can be measured.

The noise cancellation mechanism being described provides us with both lower and narrower residual noise levels. This allows us to relax the censoring or thresholding criteria used to remove bad data, while keeping equivalent data quality.

Noise is composed of background earth and atmosphere radiation and noise within the radar system. This noise has random power at any frequency. When cross-correlating the H channel voltages to itself, the random noise is also correlated as it is the same signal. When performing cross-correlation between the H and V channels the noise is uncorrelated as it is a different signal. Yet the weather signal between H and V is highly correlated.

Thus when doing this correlation over an infinite amount of samples, the noise expectation value of the H-only correlation will settle to some value while in the H&V cross-correlation the noise expectation value settles to zero. As we need to discern our signal from the noise and the noise in H&V case settles to zero we suddenly have ability to detect a weaker signal.

In reality we do not have an infinite sample size; we are limited to some finite quantity of samples. But the more samples we give as input to the Z_{hv} power estimator the better the probability of detection.

Under typical operational scan strategies sample sizes are ~40 pulses. This would give an increase of ~3 dB detectability of the Z_{hv} versus Z_h power estimator, which is equivalent to the 3dB lost due to

Enhanced reflectivity gives greater detectability versus a single polarization radar functioning at full power:

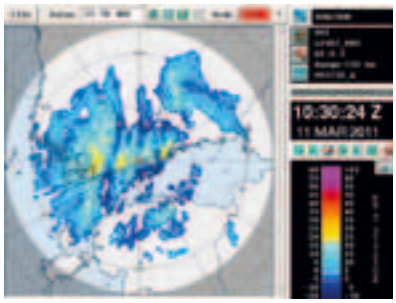


Figure 2: Volume scan data from Vaisala's Kerava radar in horizontal only transmission.

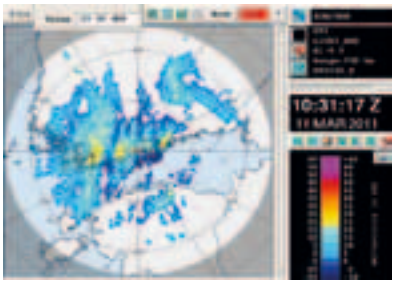


Figure 3: Volume scan data 53 seconds after data in figure 2 using STAR mode transmission. With legacy processing, 3dB of sensitivity is lost due to splitting power to horizontal and vertical channels.

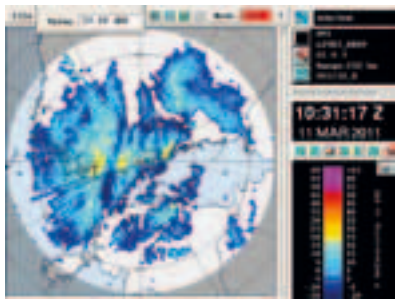


Figure 4: Same volume scan data as in Figure 2 except with enhanced reflectivity. By not having correlated noise in the power estimator there is the ability to exceed the detectability possible in single polarized radars at full power (Figure 1). The cursor position is showing a value of 22.5 dB at the same position for all figures again indicating no bias in power estimates.

splitting power. At far distances from the radar we could be able to use samples from several range bins as inputs to this new power estimator. This would significantly increase our sample size.

For example, it is possible to perform range integration of 16 contiguous bins each with 64 pulse samples giving us 1024 total samples. As Figure 1 shows the improvement in detectability over traditional processing is ~6 dB, while sacrificing some range resolution. However, as the radar beam is always expanding at far ranges we have already lost spatial resolution. It is not a bad trade-off to observe large scale precipitation with lower spatial resolution, instead of no data at all.

Enhanced Reflectivity is Unbiased and Equivalent Measurement Compared to Traditional Horizontal Reflectivity

Essentially Z_{hv} is a different physical measurement than the traditional Z_h. As Z_h is very commonly used as a decision maker, it must also be shown that Z_{hv} is an equivalent or unbiased measurement. It is also fortunate that Z_{hv} can be calibrated with attenuation corrections in the same manner as Z_h. Figures 5-6 show comparisons of the Z_h and Z_{hv} values within the same scan.

Further information:
www.vaisala.com/WRM200

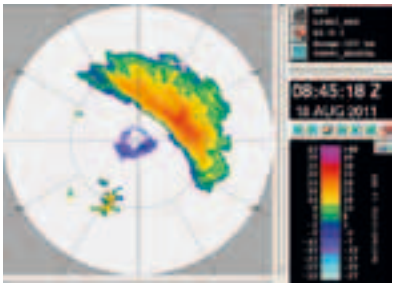


Figure 5: Horizontal reflectivity (Z_h) obtained during STAR mode operations with Vaisala's Kerava radar.

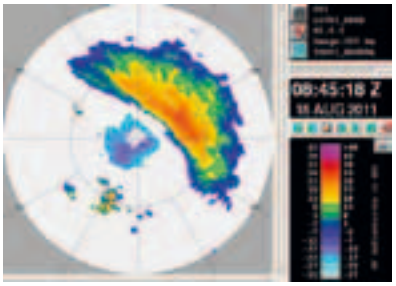
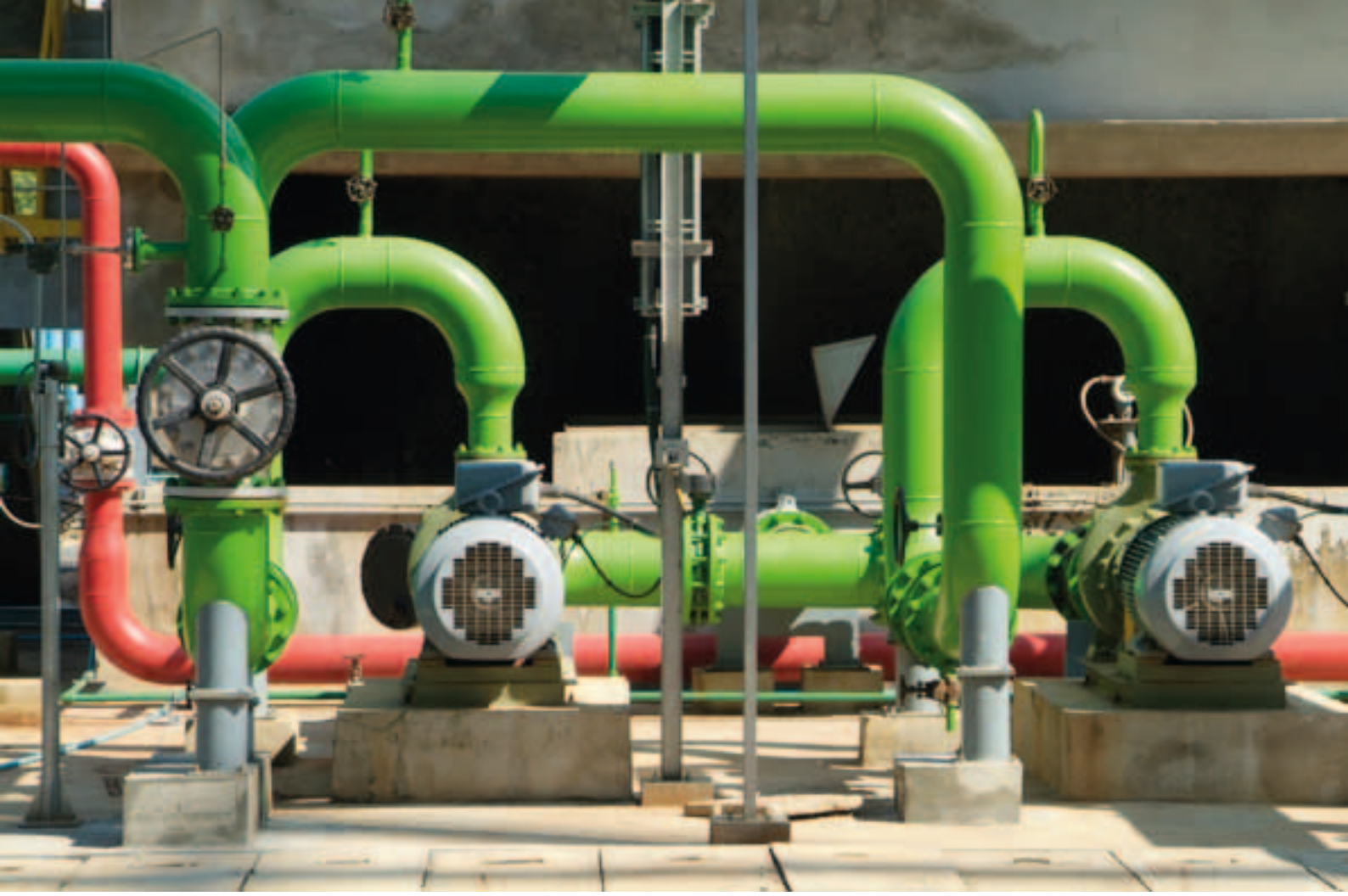


Figure 6: Enhanced reflectivity (Z_{hv}) computed from the same scan as in Figure 5. Higher rate of detection is again seen but same low false detections.



Yani Bettencourt / Market Manager, Americas / Vaisala / Boulder, CO, USA

Outdoor Wet-bulb Temperature

The Defining Measurement for Cooling Tower Operations

Measuring outdoor wet-bulb temperature helps operate cooling towers for peak efficiency.

Cooling towers are used as part of industrial HVAC systems to remove heat from process water by evaporative cooling. When evaporative cooling can occur is based on local environmental variables that can be provided by one measurement: outdoor wet-bulb temperature.

In order to operate cooling towers for peak efficiency, certain conditions need to be met. Outdoor wet-bulb temperature need to be used as the basis for the control system set point, measurement instruments need to be accurate and reliable, and operators need to routinely check instruments for sensor drift. Shortcomings in any of these areas can result in cooling tower overuse, which leads to increased water and energy usage and reduces the functional life of fans and pumps.

Industrial-scale Evaporative Cooling

The function of the cooling tower is to remove heat from the process fluids, for example from the condenser water used to cool the refrigerant in the chiller unit of the

Vaisala HUMICAP® Humidity and Temperature Transmitter Series HMT333 or HMT120/HMT130 are recommended for outdoor wet-bulb temperature measurement.

HVAC system. In the chiller, there is an exchange of heat from the refrigerant to the condenser water. This exchange cools the refrigerant and heats the condenser water.

The waste heat must be removed from the condenser water before it can accept more heat from the refrigerant. The heated condenser water is circulated out of the chiller to a cooling tower, where is it distributed onto complex porous surfaces and exposed to increased air flow provided by fans to maximize evaporation and remove heat from the water. The cooled condenser water is then returned to the chiller to accept heat again from the refrigerant.

Consequently, water and energy use are the two main operational cost drivers of a cooling tower. Condenser water lost to evaporation needs to be replaced and energy is consumed to run the tower's fans and pumps. A cooling tower with an automated control system is designed to operate at peak efficiency, minimizing the operational costs and reducing maintenance and repair costs.

Set Point Based on Wet-bulb Temperature

Like the rest of the HVAC system, the cooling tower is operated by a control system that uses set points to govern operations. The most common set points for HVAC systems are specified upper and lower limits of temperature and humidity. Cooling tower controls are based on a single lower-limit set point, outdoor wet-bulb temperature.

Evaporative cooling benefits cease when a combination of environmental variables – relative humidity, water vapor saturation pressure, and temperature – reach a point where liquid water cannot vaporize into the air. Outdoor wet-bulb temperature is the lowest temperature that can be achieved purely by evaporative cooling. It is also the

lowest possible temperature of the process water leaving the tower. Wet-bulb temperature is always less than or equal to the dry-bulb, or ambient air, temperature.

"Cooling towers are designed to operate to a range of wet-bulb temperatures in a certain location. Tower operators need to be able to answer the question 'What is the wet-bulb temperature?' If they can't answer that, they are not using the best measurement for their operations," says Tim Wilcox, an international energy efficiency consultant with the U.S.-based company WPI.

Dew Point Temperature an Option

Dew point is the temperature where condensation begins: the temperature at which air becomes fully saturated with water vapor resulting in the formation of liquid water.

For use in cooling tower control systems, dew point temperature is the next best measurement to wet-bulb temperature since it measures a temperature where water is condensing (not vaporizing) and it correlates to the amount of water vapor in the air at that temperature. Like wet-bulb temperature, dew point temperature is always less than or equal to the dry-bulb temperature.

Relative Humidity Falls Short

Relative humidity is the most commonly used humidity measurement. It is the ratio, expressed as a percentage, between the amount of water vapor present and the maximum amount that is physically possible at that temperature.

The major drawback of using relative humidity in cooling tower operations is that it is heavily dependent on temperature. The capacity of air to hold water vapor is dependent on temperature; for example, if the temperature is 18°C and the relative humidity is 96%, an increase in the air temperature of only 2°C reduces the relative humidity to 85%.

Due to its familiarity, relative humidity is often used in cooling tower operations, but it does not provide the temperature at which evaporative cooling effects stop. However, relative humidity and temperature from sensing devices should both be used as inputs to calculate wet-bulb temperature.

Measuring Wet-bulb Temperature

Traditionally, wet-bulb temperature was measured by a thermometer covered with wet cloth (or wet sock) and exposed to air flow. A sling psychrometer is a device with two thermometers, one thermometer measures ambient temperature (i.e. dry-bulb temperature) and the other measures wet-bulb temperature. The wet-bulb thermometer is fitted with a wet wick and then whirled around to generate air flow and evaporative cooling. These low-precision measurement instruments require manual operation and do not provide the accuracy and reliability required for industrial-scale cooling tower control systems.

Today, wet-bulb temperature is calculated based on measurements of relative humidity and temperature. These calculations can be programmed into the control system to eliminate manual calculation errors.

Best Practices for Best Results

Wilcox recommends tower owners adopt four best practices for operating the cooling tower as it was designed.

First, the mechanical engineer designing the system should specify that the control system be pre-programmed to automatically calculate wet-bulb temperature based on direct measurements of relative humidity and temperature.

Second, the system designer should specify high-quality sensors that are accurate, not prone to sensor drift, and stay in calibration.

"Operators do not always understand the significant financial consequence on relying on low-cost, low-quality sensors," Wilcox says.

"These inexpensive, error-prone sensors can cost hundreds of thousands of dollars in wasted energy use and equipment damage from overuse if the sensor produces inaccurate readings that indicate evaporative cooling can occur when it can't."

Third, during commissioning, the operator should confirm that the sensors and the control system program are in compliance with specification. Finally, tower operators need to perform routine maintenance on the sensor as recommended by the manufacturer for accuracy and reliability over the long run.

Further information:
www.vaisala.com/HVAC

Humidity Formulas: Conversions Made Easy

Vaisala publishes free tools to calculate or convert relative humidity, dew point/frostpoint, absolute humidity, water content, mixing ratio, vapor pressure, parts per million, and wet-bulb temperature.

A white paper containing the essential humidity conversion formulas used by Vaisala digital instrument is available at www.vaisala.com (keyword: humidity conversion formulas).

Online and downloadable calculators are available for several humidity parameters from one known value to make unit conversions quickly and see the effects of changing ambient conditions, like temperature and pressure. Available at www.vaisala.com/humiditycalculator.

Senja Leivo / Regional Segment Manager / Vaisala / Helsinki, Finland

Online Dew Point Monitoring of SF6-Gas-Insulated Equipment

In recent years, online monitoring of dew point in SF6 gas has become increasingly common. However, the factors that affect the reliability of online measurement in an environment where there is no gas flow, are not so well known.

In order to maintain the insulation properties of sulphur hexafluoride (SF6) gas and to reduce the formation of corrosive by-products from SF6 decomposition, the amount of water vapor in gas-insulated high-voltage equipment must be kept to a minimum. Although initially filled with dry gas and being closed equipment at elevated pressure with no external gas flow, the high penetration ability of water molecules may increase the moisture level, especially as equipment ages.

Traditionally, moisture level has been checked using periodically taken gas samples, but in recent years condition-monitoring systems that incorporate online instrumentation for measuring the dew point of SF6 have become increasingly common. However, it has become apparent that this type of application presents challenges that are quite different to those experienced in more typical industrial dew point measurement or the measurement of basic parameters such as pressure and temperature in SF6-insulated equipment.

In particular, the method of installation, the materials used in the measurement system, and the connector types are critical in determining whether the measurements really do provide the intended valuable data for asset management. Furthermore, remote equipment location often sets demanding requirements for stability and the length of the maintenance period of instrumentation used.

Water Vapor Pressure and Dew Point

Water vapor exists everywhere, and it is always part of total gas pressure – for example, atmospheric (barometric) pressure or system pressure in gas-insulated equipment (GIE).

Dew point/frost point ($T_{d/f}$) is defined as the temperature at which the partial water vapor pressure (p_w) of a gas is equal to the vapor saturation pressure (p_{ws}). In other words, dew point is the temperature to which a gas must be cooled in order

for the water vapor to condense into dew or frost -> $p_w = p_{ws}(T_{d/f})$.

Dew point is not a temperature-dependent parameter, thus it can be measured by taking a gas sample at a temperature different than system temperature. Dew point is, however, highly dependent on pressure, so it is crucial to confirm that it is being measured at the same pressure as the main gas volume, or to know the exact pressure values, in order to be able to carry out the correct conversion for the values – for example, dew point at 4 bar or dew point at atmospheric pressure.

Vapor Diffusion

In the vapor phase (gas), water molecules are not bound, and due to their small molecular size they can move about easily. Water vapor tends to reach equilibrium between different phases, thus water molecules tend to migrate from higher vapor pressure to lower, even through polymeric materials like sealing rings or along metal surfaces at connection points.

This behavior also occurs from lower total gas pressure to elevated system pressure, for example in the case of ambient air vs. SF6 in high-voltage equipment. So pressure-tight does not necessarily mean water-vapor tight. The diffusion effect is very slow and is only visible through online measurement of small volumes of static gas.

Moisture Transients

Water vapor pressure inside a sealed gas system does not remain exactly constant, even if diffusion does not occur. Temperature variations in the system drive moisture (vapor) transients between the two phases, i.e. gas and solid materials in contact with the gas. When temperature increases, solid materials release vapor to the gas because the two different phases tend to reach moisture equilibrium, i.e. equilibrium-relative humidity; with decreasing temperature the inverse occurs.

Outdoor installation into a "sensor block".

The moisture sources inside gas insulated equipment systems can be the pores of metal surfaces and organic materials such as spacers and sealing rings. The larger the surface area of solid materials, versus volume of gas, the greater the effect of vapor transients on dew point.

Figure 2 shows the effect of vapor transients in an on-site installation in Finland during fall 2010. Due to the fact that the sensor is installed in a small block with both long tubing from the main gas volume and multiple connection points, the gas around the sensor area does not necessarily represent the true dew point conditions inside the main gas tank.

It was not clear whether the detected moisture transients were occurring solely in the main gas volume or just along the gas sampling line where the sensor was located. It was not possible to take any reference measurement directly from the main gas volume because there was no available connection point for an additional sensor.

One other important factor with such installations is temperature. If the sensor is installed in a remote location, it is possible that at some point the temperature at the sensor location will be significantly different than in the main gas volume, thus the moisture transients in the main gas volume and along the gas line result in the gas having significantly different moisture levels.

Due to the fact that vapor diffusion in static gas is a very slow process, the measured dew point values may not be representative of the main gas volume. This is especially likely to happen in the case of constant temperature variations, which result in continuous dynamic moisture transients, i.e. equilibrium is not achieved.

This kind of setup would not be problematic in the case of pressure or density measurements, but with dew point measurement such installations may result in incorrect conclusions. The volume of water vapor relating to the transients in the gas line is extremely small, but it becomes visible during online measurement in a small volume of static gas.

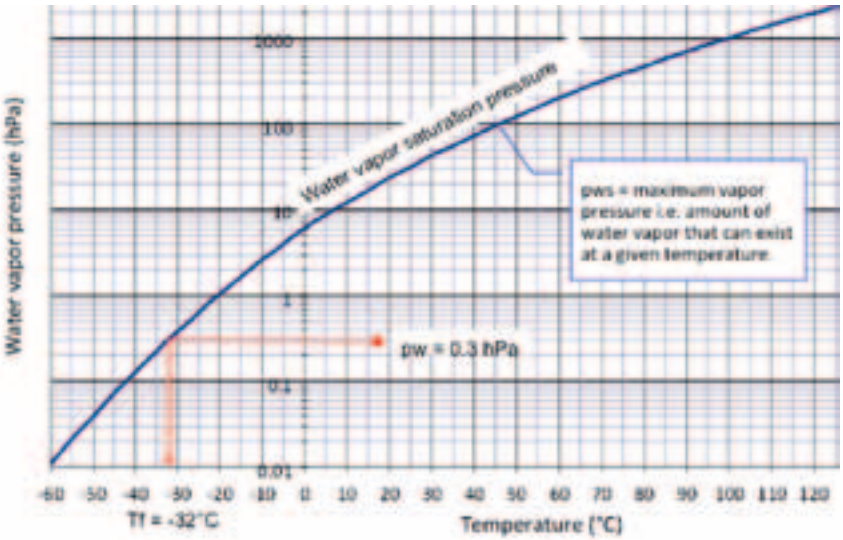


Figure 1. Example: water vapor pressure 0.3 hPa (mbar) vs. dew point.

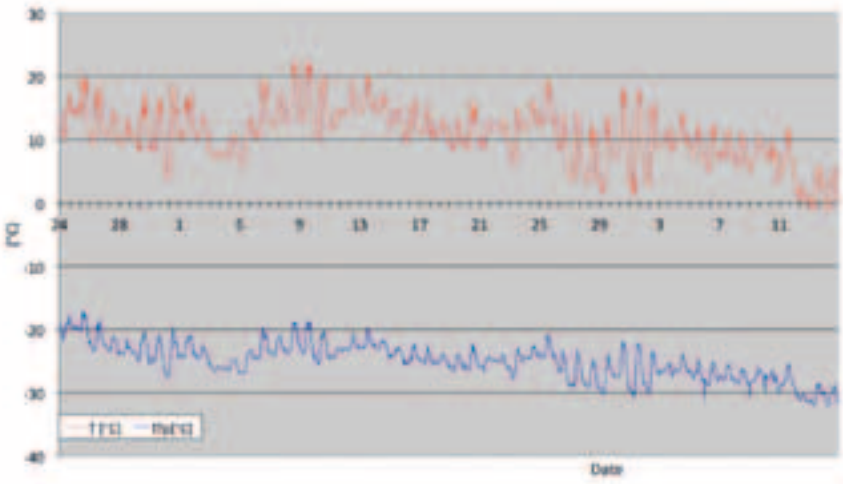


Figure 2. Measured dew point (Tfp) vs. temperature of an SF6- insulated switch in Finland (fall 2010).

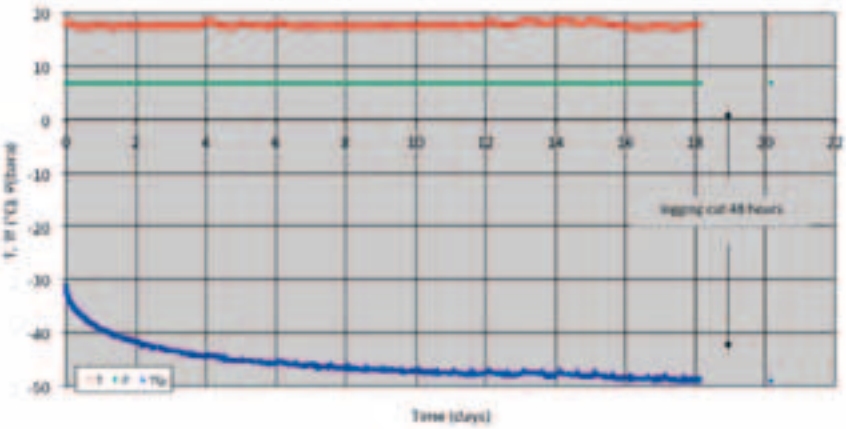


Figure 3. Measurement data (dew point, pressure, and temperature) from an indoor system.

Installation of an Online Dew Point Sensor

When designing an online measurement setup for a dew point sensor in SF6-insulated equipment, the basic principles of water vapor behavior described earlier should be taken into account in order to ensure correct measurement and thus to enable valid conclusions to be drawn.

Traditionally the dew point of SF6 has been measured by taking a gas sample from the tank, meaning that there has always been gas flow to account for during these measurements. Gas flow conceals the effect of very slow diffusion and vapor transients between gas and solid materials.

To date it has been quite common for dew point sensors to be installed in the same sensor block as pressure relays or density sensors. In addition, these blocks are often not directly attached to the main gas tank, but connected to the tank with either polymeric or metal tubing.

These various connection points and tubing are likely to introduce space for vapor diffusion and provide a medium for moisture transients. In a relatively small volume of static gas, these effects begin to play a dominant role, thus installing a dew point sensor in the manner described above would likely result in measurements that do not necessarily provide the intended valuable data for asset management.

In order to ensure the best possible online dew point measurement in an SF6-insulated system, the sensor should be installed as close to the main gas volume as possible, preferably directly onto the tank wall. Minimizing the number of connection points and avoiding the use of plastic or rubber materials close to the measurement cell is also highly beneficial. Metal-to-metal sealing should be preferred whenever applicable.

System Response After Sensor Installation

The response time of dew point measurement in gas insulated equipment is not defined by the response time of the sensor itself, which is typically measured in seconds or minutes. The dominant factor is the system response after installation.

When installing the sensor, some initial moisture from ambient air is also introduced into the system's connection point. Considering the total SF6 volume, this amount of vapor is negligible; however, from the point of view of the sensor inside the measurement cell, the effect is clearly visible and measureable.

It will take quite some time for the vapor pressure in the measurement cell to reach equilibrium with the main gas volume. Even if the sensor is installed very close to the main tank, it can take hours or even a few days until the vapor pressure, and therefore the dew point, are equal in both gas volumes.

The system response time is determined by how quickly the measurement cell dries to the same vapor pressure as the main SF6 volume after the installation, meaning how quickly water molecules move from solid materials to the gas in the cell and then diffuse from the cell to the tank, finally reaching equilibrium.

The drier the gas, the longer the drying of the solid materials and surfaces takes, especially in static gas. The distance between these two volumes and the dryness of the SF6 affects the diffusion rate from the cell back to the tank. The longer the distance and the dryer the gas, the longer it takes to achieve a 100% correct response.

If there is too much diffusion through the tubing or contact points, it is also possible that the vapor pressure inside the measurement cell will never reach equilibrium with the main gas volume, and thus the measurement will not be representative of the true conditions inside the tank. It is therefore very important to minimize the introduction of initial moisture during installation.

Table 1:

+20°C	**SF6 @ 4 bar**	**Ambient air**
Dewpoint	–40 °C	+9.3 °C
Relative humidity	0.6 %RH	50 %RH
Vapor pressure (pw)	0.13 mbar	11.7 mbar
+35 °C		
Dewpoint	–40 °C	+31 °C
Relative humidity	0.2 %RH	80 %RH
Vapor pressure (pw)	0.13 mbar	45 mbar

Table 1. Examples of dew point, relative humidity, and vapor pressure in a gas tank and in ambient air at two different temperatures (+20 and +35°C) and in ambient humidity conditions (50 and 80 %RH). Water molecules (H2O) tend to move from high vapor pressure to low vapor pressure in order to reach equilibrium.

In order to avoid water droplets getting into the sensor connector, installation should not be carried out during rainy weather conditions. Great care should also be taken to ensure that no dust or dirt particles remain on the sealing surfaces, because these may later act as a medium for the diffusion of water molecules, ruining the measurement and, in the worst case, causing wetting of the SF6. In outdoor installations, a rain shield should be used to prevent water from gathering on the connection points and increasing vapor diffusion.

System Response During Operation

It is reasonable to ask how the sensor responds if the dew point of the main SF6 gas volume starts to increase, as the system response is rather slow directly following sensor installation. The most dominant factor determining this slow initial response is that the drying of solid material surfaces (pores) takes a long time even when gas flow is involved; in static gas drying takes significantly longer. This phenomenon only has a marginal effect when gas containing more moisture diffuses from the main tank into the drier measurement cell, where dew point is measured.

A second factor to take into account is that in a high volume of SF6, dew point increase by diffusion through sealing materials or along metal surfaces is a very slow process. It is evident that when dew point starts to increase in the main tank, it also starts to increase in the measurement cell and is detected by the sensor more or less at the same time – assuming that the sensor is sufficiently close to the main tank.

Whether the dew point values are exactly the same at the same point in time (100% response) is not really relevant because it is the increasing trend that highlights the fact that corrective action needs to be taken. Any quick, dramatic change in dew point indicates a leak that should be detected by both dew point and pressure measurement.

Further information:
www.vaisala.com/energy

Cesar Guerrero Cordoba / Project Manager / Vaisala / Boulder, CO, USA

Vaisala Weather Radars in Colombia

Vaisala's weather radars and global lightning data help increase awareness of severe weather in Colombia and along its oceanic routes.

Colombia is part of the new set of raising economies expected to excel in the next decade, which are referred to in the world news as CIVETS. In recent years, Colombia has been investing heavily in the availability of its meteorological services, including the installation of new weather radars.

Vaisala installed the first Vaisala Weather Radar WRM200 in Columbia in 2011, and soon after won the contract for second radar deployed this year. Along with the weather radars, Vaisala provides Colombia the Global Lightning Dataset GLD360 data to increase their awareness of lightning

activity within the country and along the neighboring oceanic routes.

Improved Security for Civil Aviation

In 2010, the Colombian civil aviation authority Aeronautica Civil de Colombia invested in the first Vaisala WRM200 dual polarization weather radar. Installed near Bogotá, the radar is of vital importance to local civil aviation, since it helps to optimize the meteorological service, and therefore leads to improved aerial navigation security in the most important airport of the country.

The second Vaisala weather radar to Colombia's network was installed and integrated in the first two quarters of 2012. The second radar is located in Corozal, in the north of the country. Both Corozal and Bogotá radars will be integrated with Vaisala Midas IV/AviMet airport systems already installed.

With the Columbian installations, Latin America has welcomed four Vaisala radars in only two years, in Colombia, Brazil and Mexico.

Increased Early Warning Capability for Severe Weather Conditions

As Vaisala's WRM200 is designed for mesoscale observations, it helps short-term weather forecasting, enabling early warning of adverse weather and following the trajectory of extreme conditions. For Colombia this is important because severe weather has been affecting the country; especially phenomena like el Niño and la Niña have become more evident and aggressive during recent years.

The radar data will facilitate the decision support for civil protection. With the correct processing of the data, it is possible to feed the information to other systems to mitigate damages in flood prone areas, for example.

Moreover, the added value of the Vaisala Global Lightning Dataset GLD360 will give Aerocivil a view on storms that approach from the Pacific, the Atlantic, and the neighboring countries. This helps manage air traffic safely and also enables giving advanced severe weather warnings. The real-time lightning data generated by the GLD360 service greatly enhances forecasting and early warnings capability for high seas, thunderstorms and cyclones.

Network of Weather Radars Over Next Five Years

The Bogotá radar is part of the Aeronautica Civil de Colombia's effort to implement a network of weather radars during the next five years to compliment the weather information obtained by their ground network of stations, satellite information, and other remote monitoring observation equipment.

Enhancing meteorological services and forecasting is expected to guarantee regular, safe and efficient operations at the Bogotá International airport, and progressively in the whole national territory. It will also contribute to the development of the country by providing useful information to the organizations in charge of hydrometeorology, civil protection, power generation, and other mission critical agencies. A long-term goal is to use the combination of remote observation data for numerical weather prediction, as Colombia continues to modernize its meteorological systems.

Vaisala has been present in Colombia for over 20 years, serving various customers from the civil aviation and national weather service to one of Latin America's biggest utility companies.

Further information:
www.vaisala.com/weatherradar

Safe at Sea

Vaisala weather systems ensure safe helicopter travel to offshore oil rigs at the Caspian Sea.

Safety, security, efficiency. These are the top requirements in any maritime operation, both onshore and at the sea. As weather conditions have a very concrete impact on ships, ports, offshore platforms and other maritime operations, accurate and reliable environmental measurements and monitoring play a vital role in ensuring the safety of everyone onboard and the efficiency of operations at hand.

Helicopter traffic to offshore operations is especially vulnerable to weather due to high winds and poor visibility conditions that frequently occur at the sea. Real-time meteorological data keeps traffic on the route, and ensures safe take-offs and landings. Weather information also helps avoid delays, which becomes critical when rescue flights are needed.

To ensure safe travel to and from its oil rigs, the State Oil Company of Azerbaijan Republic (SOCAR) chose to install Vaisala's maritime weather stations at several of its offshore oil platforms at the Caspian Sea.

Origins of Oil Industry

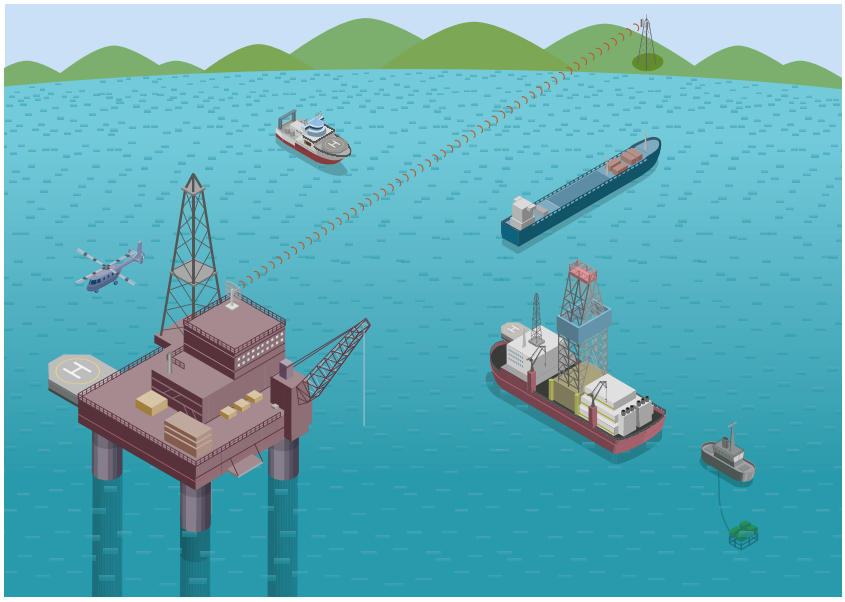
Covering more than 143,000 square miles, the Caspian Sea is the largest enclosed body of water on Earth. Bordered by Azerbaijan, Russia, Kazakhstan, Turkmenistan, and Iran, it is located in between the eastern edges of Europe and Asia.

Rich in oil and gas reserves, the Caspian Sea has a long history in hydrocarbon production. In fact, Azerbaijan is one of the birthplaces of modern oil industry; in the turn of the 20th century, the country's capital Baku was already an international oil center. Today SOCAR is one of the world's leading companies in the hydrocarbon industry; Azerbaijan produced 46 million tons of crude oil and 16.5 billion cubic meters of natural gas last year.

Safe, Regular and Efficient

Looking to modernize their meteorological service for safer, regular and more efficient helicopter traffic to and from its offshore platforms at the Caspian Sea, SOCAR decided to install new weather stations on several of its oil rigs.

Thanks to the reliability, sustained accuracy and durability of Vaisala's equipment in long-term use and in harsh marine environments, Vaisala was chosen to deliver the new stations. The entire SOCAR platform network at the Caspian Sea now



Weather information supports decision-making in managing safe and efficient operations on offshore platforms.

has access to accurate and reliable weather data at all times. In addition, the new weather stations were connected to an existing hydromet network, which is owned and operated by the country's hydrological services.

Vaisala's partner in the project was the Hydrometeorological and Climatic Change Consulting Center of Azerbaijan, who was the integrator in SOCAR's modernization effort. The Hydrometeorological and Climatic Change Consulting Center provides a broad scope of services for the implementation of hydrometeorological systems, including the installation of meteorological systems at airports and marine environments, the installation of roadside weather sensors, civil works for the installation of weather radars as well as different related maintenance services.

Full Awareness of Surrounding Environment

Vaisala offers the offshore oil and gas industry specialized meteorological, hydrological and oceanographic monitoring systems, instruments and engineering services, complemented with forecasting and decision support applications. Designed to allow the customer to concentrate on their main operations, the systems continuously monitor both weather and sea state to provide full awareness of the surrounding environment.

Thanks to the largely modular and upgradeable nature of Vaisala's equipment, the systems can be expanded and enhanced as needed. Instruments can be included or excluded based on platform or vessel types or specific application requirements. Moreover, one system can be used for several simultaneous applications, such as helideck and environmental monitoring, which helps to optimize cost efficiency.

Vaisala's instruments and systems comply with international aviation and maritime standards, and fulfill all relevant ICAO requirements and WMO recommendations. The equipment is field-proven and low maintenance, and support is provided throughout the system's life-cycle. For example, Vaisala can perform and keep track of regular preventive maintenance, supply spare parts, and take care of software upgrades – priority care is given to decrease the need for unforeseen repairs and to ensure that the highest quality data is always available.

Automatic Weather Station for Critical Maritime Applications

The Vaisala AWS430 Automatic Weather Station is a specially designed weather station for maritime environments. The basic configuration measures wind speed and direction, atmospheric pressure, air temperature, and humidity, but additional sensors can be installed for a host of other parameters from water temperature and the amount of precipitation to cloud height, visibility and ship motion.

All the materials of the Vaisala AWS430 have been selected for their ability to withstand the harsh and corrosive maritime environments. Outdoor enclosure is designed to withstand the salty and wet conditions that prevail aboard ships and platforms as well as the freeze/thaw conditions experienced in extreme-weather environments. It also endures vibration and shock well.

The Vaisala AWS430 has successfully passed a variety of environmental, electrical, vibration and shock tests. All test specifications comply with both the Lloyd's Register approval system and the IEC 60945 international maritime standard.

Further information:
www.vaisala.com/maritime

Sanna Nyström / Editor-in-Chief / Vaisala / Helsinki, Finland

Billion Strikes and Counting

Vaisala's global lightning detection network helps improve the safety of people and property everywhere.

Lightning is one of nature's most destructive phenomena. According to estimates, lightning causes over 20,000 fatalities and 10 times as many injuries globally every year, and costs relating to damages and avoidance measures amount to billions of dollars annually.

Vaisala has been developing lightning detection technology for more than 35 years. Real-time lightning data enables the early detection and accurate tracking of severe weather, which saves lives and helps make more informed decisions to safeguard property and increase operational efficiency in industries that are vulnerable to lightning, such as aviation, shipping, and power generation and distribution.

Uniform Coverage – Globally

Vaisala owns and operates the largest source of real-time lightning information in the world, the Vaisala Global Lightning Dataset GLD360. Bringing together information from a network of very low frequency sensors installed all over the world, the dataset provides highly uniform lightning detection coverage also in areas that otherwise lack sufficient meteorological observations.

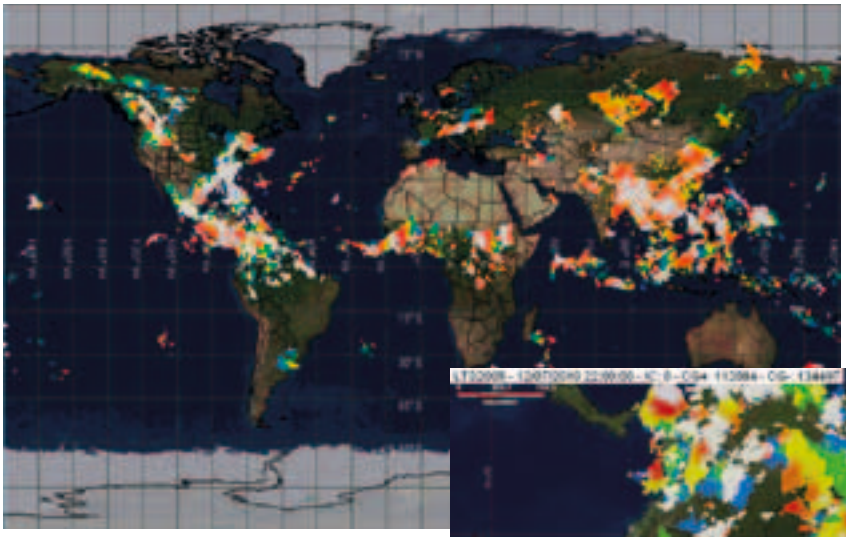
Uniform coverage is especially useful over the large oceanic regions of the world, where lightning information helps keep track of meteorological systems as they form, grow and dissipate. As the GLD360 shows the shape, size, orientation, and time changes of lightning activity over remote areas, it helps identify a storm occurring over an ocean in a more precise way than would be possible by using satellite data alone.

Over Billion Strikes Detected

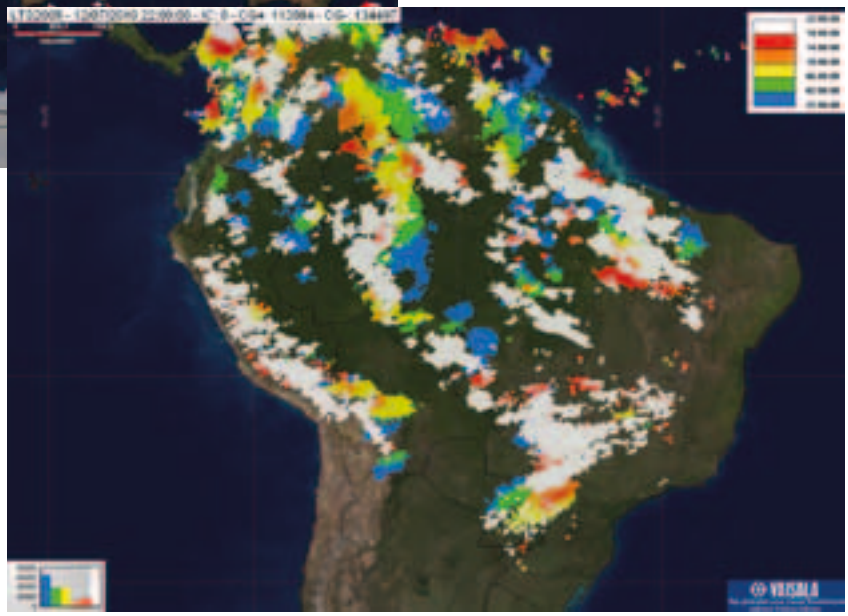
With its advanced patented algorithms, the GLD360 catches more lightning activity on a global basis than any other technology. The network has detected 33,258,377 strikes per month on average since its inception in 2009, and the daily counts routinely exceed 1.5 million events.

The GLD360 uses the VLF (very low frequency) radio frequency spectrum to detect the electromagnetic signals that a lightning strike gives off. It then processes the information, providing the location, time, polarity and amplitude of each strike. It is the only global lightning dataset that provides polarity and peak current estimates for lightning events. Peak currents refer to the exchange of energy each lightning generates between the cloud and ground that manifests itself in the form of electrical current.

Currently the network identifies the location of a cloud-to-ground lightning strike within a range of 2-5 kilometers. Its polarity classification accuracy is better than 90 percent, and peak current estimates are accurate within 25 percent of the peak current value. Validation studies have verified the network's cloud-to-ground flash detection efficiency to be 70 percent or greater.



The GLD360 reported over two million lightning events across the globe on 23 June 2011. Colors show age of lightning events in 4-hour intervals with shades of blue representing data from 00-04 UTC, and shades of white representing data from 20 UTC on 23 June to 00 UTC on 24 June.



Frequent lightning over some of the most remote locations in the world, in northern and central South America.

One Technology, Numerous Applications

Thanks to being a truly global source of quantitative lightning data, the GLD360 provides information for a variety of different uses. As Vaisala owns and operates the network and the data is streamed to the customer, information on detected lightning activity can be delivered to the end user in less than two minutes.

Data from the network can be assimilated into weather models to improve short-to-medium term weather forecasting. It can be used to improve prediction of high and rough seas, or the development of advanced flood warning systems.

The GLD360 data can also be used as a proxy for weather radar information in areas with limited or non-existent radar coverage, as radar reflectivity can be simulated by processing lightning data through advanced algorithms. This provides the means to identify and monitor active storms in those parts of the world that don't have access to weather radar information yet.

In the areas of the world where radar coverage does exist, lightning data continues to provide added information that pinpoints where lightning could become a threat to people and property.

Volcanic Ash Cloud Detection

Vaisala Global Lightning Dataset GLD360 includes technology that can provide early warnings of explosive volcanic ash clouds that cause disruptions to aviation, cost millions in losses due to unplanned flight delays and cancellations, and can pose a threat to the safety of travelers.

The GLD360 detects lightning produced by volcanic eruptions, which is a key indicator of potential ash cloud bursts. During the first 30 hours of the eruption of the Icelandic volcano Grimsvotn in 2011, the GLD360 detected over 14,000 lightning events within a 30 kilometer radius surrounding the volcano.

Volcanic eruptions can happen anywhere in the world, but all volcanoes do not have the required instruments nearby to detect the eruptions as soon as they occur. Observing the eruptions using weather satellite imagery can also sometimes be difficult, as multiple layers of clouds can limit the view of the volcanic ash cloud itself. Detection of lightning in ash clouds can enable scientists and the aviation community to detect explosive volcanic eruptions as soon as they occur.

Further information:
www.vaisala.com/gld360

2011 Corporate Responsibility Report Published

Vaisala published its fourth Corporate Responsibility Report this spring. The 2011 report discusses Vaisala's continued commitment to further strengthen the company's role as the responsible employer, the sustainable supplier and the fair business partner it is known to be.

In his opening remarks, President and CEO Kjell Forsén talks about the new era of sustainability and its implications for Vaisala. Highlights of the report include case studies on Vaisala's first weather radar installations in Latin America, the development of maintenance decision support system technology for road authorities, a tsunami warning network in Chile and Vaisala's role in monitoring radioactive radiation in Japan.

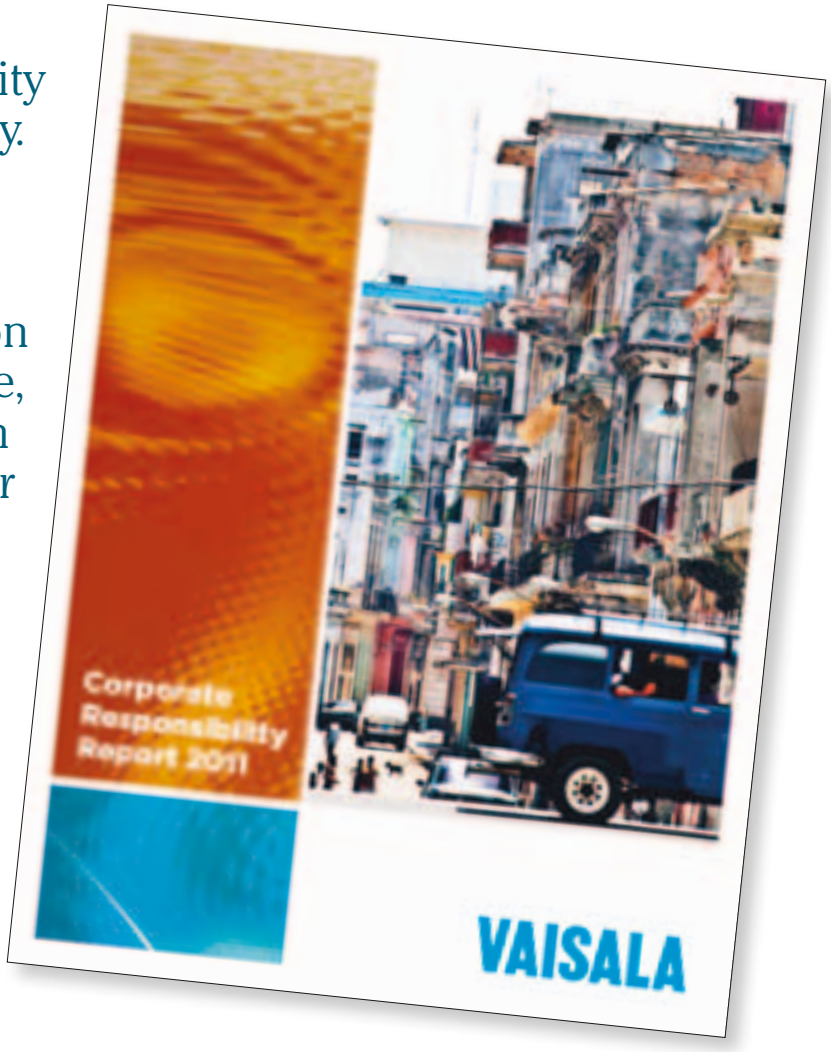
Vaisala's sustainability reporting is based on the Global Reporting Initiative's G3 Framework, which is the most widely used corporate responsibility reporting standard today. The 2011 report complies with the GRI G3 Application Level B, disclosing some 50 performance indicators that are material for Vaisala's sustainability program. Vaisala's report also qualifies, for the second year running, for the Advanced Reporters level of the United Nations Global Compact initiative, which Vaisala joined in 2008.

The fundamental purpose of sustainability reporting is to provide an insight into Vaisala as a company beyond financial information, product offering and technological details. In addition to enhancing the transparency of Vaisala's business behavior, public reporting encourages the continuous improvement of internal processes. Vaisala has been reporting on corporate responsibility since 2008.

The 2011 report is available for browsing online and for downloading at www.vaisala.com/sustainability.

"Corporate responsibility is a Vaisala-wide priority. We strive to conduct our business fairly and with integrity. Our strict zero-tolerance policy on corruption, for example, binds not only our own staff but also that of our representatives."

– President & CEO Kjell Forsén



Linus Torvalds with Kjell Forsén, Vaisala's President and CEO, and Raimo Voipio, Chairman of the Board.

Millennium Technology Prize Winner Linus Torvalds visited Vaisala

Linus Torvalds, the creator of the open source computer operating system known as Linux visited Vaisala in early June. The visit was a part of the official Millennium Technology Prize program accompanying the announcement of the prize winners.

The Millennium Technology Prize is Finland's tribute to life-enhancing technological innovations. Awarded every second year, it is the world's largest technology award. Torvalds won the 2012 Millennium Technology Prize together with Dr. Shinya Yamanaka, a Japanese physician and ethical stem cell researcher.

The visit to Vaisala included a general introduction to the company, including a look into the use of Linux and the general importance of software in Vaisala's systems. The guests also visited Vaisala's weather radar laboratory, and performed a test sounding.

Linux is probably the most widely used open-source system today. Millions use it every day as it can be found on everything from inflight entertainment systems to streaming video players and smartphones.

Weather Radars to Finnish Meteorological Institute

Vaisala delivers three weather radars and related services to the Finnish Meteorological Institute (FMI). The new dual polarization weather radars will replace three of FMI's current radars, and they will be taken into use during 2012-2013.

The contract includes an option for two additional radars, and it relates to FMI's project to renew the entire Finnish weather radar network. Vaisala has already delivered three new dual polarization radars to FMI in 2009-2010.

"The information that national weather radar networks provide is critical for the functioning of modern societies. The dual polarization radar developed by Vaisala provides significantly more accurate information on rainfall and different precipitation types, which is especially valuable in improving the safety of road and air traffic", says Juhani Damski, Director of Weather and Safety at FMI.

Simplest Cold Chain Temperature Data Logger Introduced

Vaisala has launched a new cold-chain solution, the Vaisala Cold Chain Logger CCL100 for temperature monitoring. The new logger further complements Vaisala's portfolio of monitoring and measurement systems for temperature and other critical parameters in life science environments and processes.

"In speaking to life science industry professionals who handle complicated logistical processes, we learned that the simpler the cold chain device, the better. Other things being equal, a simple solution is better than a more complex one," says Jim Tennermann, Business Segment Manager for Vaisala Life Science.

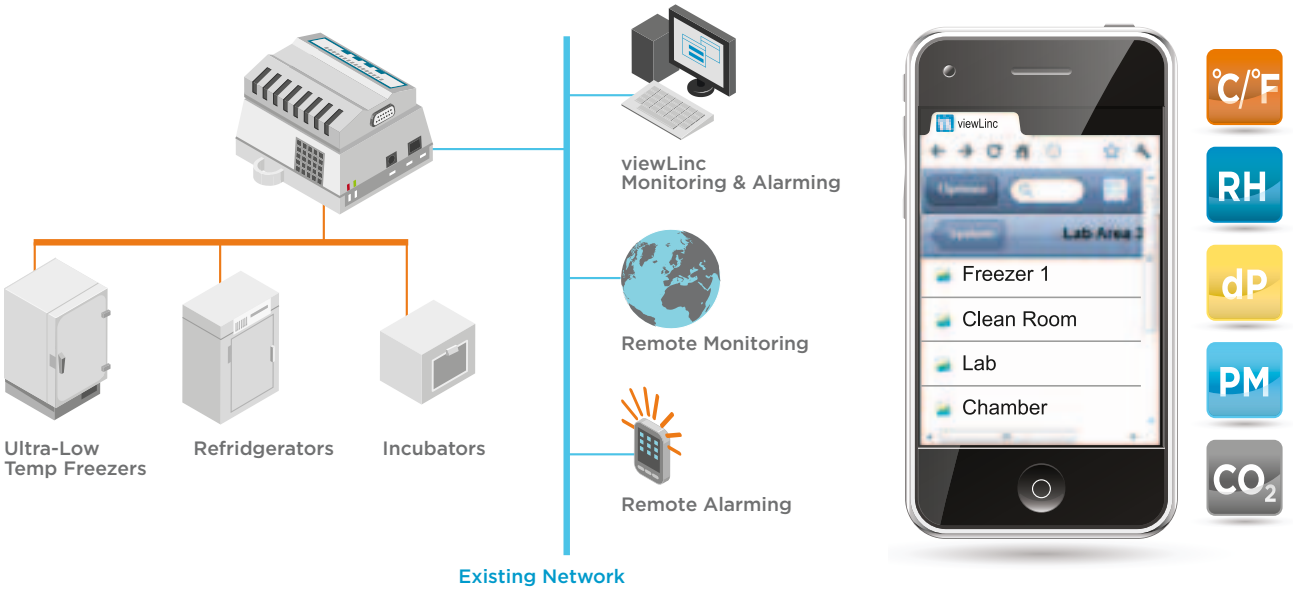
"Our loggers provide the most accurate data and critical documentation via the simplest delivery system possible."

Unlike many other cold chain temperature monitors, the Vaisala CCL100 features a thin, compact size for easy placement and more accurate sensing from surface reads on the product as opposed to ambient conditions. The data loggers do not require special readers or proprietary software; any computer equipped with Adobe Acrobat reader will generate a comprehensive report when the logger is connected to the computer's USB port.

Ideal for monitoring the temperature of vaccines, pharmaceuticals, biologics, and other life science products during distribution, the Vaisala Cold Chain temperature data logger reduces the risk of product degradation during shipping in the easiest possible way.

Vaisala WMT700 Certified for Maritime Use

Vaisala received a Type Examination Certificate for the Vaisala WINDCAP® Ultrasonic Wind Sensor WMT700 from the Det Norske Veritas (DNV) in March 2012. The certification guarantees that the Vaisala WMT700 complies with the IEC60945 Ed. 4 (2002-08) Maritime navigation and radiocommunication equipment and systems.



Mobile-Optimized Continuous Monitoring System to Enhance Life Science Product Safety

Vaisala has launched a new version of its monitoring, alarming and reporting software for the Vaisala Continuous Monitoring System. Aimed at highly demanding controlled and regulated environments in the pharmaceutical and biotechnology industries, the viewLinc software offers an optimized mobile interface for remote monitoring and alarm management. This, along with the location-based reporting and data logging capability, allows users to act on alarms immediately, anywhere and anytime on their smart phones, to improve product safety and ensure compliance with GMP and other regulations.

Other key features include a greatly enhanced user interface that is easier to navigate, more customization capabilities in historical reports, live multiple-channel trend display for enhanced reporting and language localized versions in French, Chinese, German and Japanese. With the mobile interface, users can acknowledge and pause alarms, view live trends on any monitored location under their control, and view trend data in real-time.

"Like its predecessors, the new version is easily deployed for monitoring temperature, relative humidity, CO_2, differential pressure, level, door switches, and more. But, we built this version of viewLinc based on working closely with viewLinc users. Every new feature and interface capability came from feedback and suggestions we got. The software addresses the changing needs of our customers and integrates new technologies and user expectations, such as drag and drop and mobile usage," says Jon Aldous, Product Manager for Vaisala's Life Science business.

Humidity Seminar Series in US and Canada

Vaisala's popular Humidity seminar series kicked off again this spring. This year a new seminar titled "Monitoring & Mapping cGMP environments" was added to complement the already established Humidity 201 sessions.

The new seminar helps GxP-compliant facilities reduce the risk of deviations being observed during audits and inspections. It reviews the relevant GMP regulations and guidances around temperature and humidity mapping and monitoring and includes a workshop where participants will get hands-on experience of temperature and humidity validation.

Further information:
www.vaisala.com/seminars

Value of Lightning for Safety and Asset Protection

More than 100 lightning experts from across the world gathered together as Vaisala hosted its 22nd bi-annual International Lightning Detection Conference (ILDC) and 4th International Lightning Meteorology Conference (ILMC) in Broomfield, Colorado in April.

The theme of this year's event was "The Value of Lightning Information for Safety and Asset Protection." Presentations covered the continued growth in understanding of the phenomena of atmospheric electrical discharges, in particular lightning, and their complex relationships with other meteorological events. The challenges posed to detection technology and network data applications were also discussed broadly.

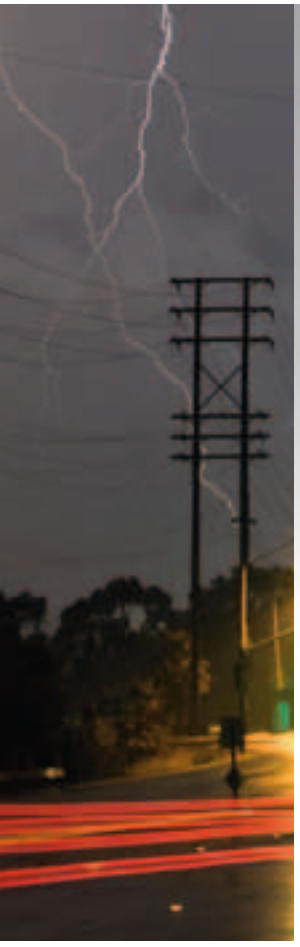
"Recent findings in atmospheric physics, detection technology and network performance show the importance of ongoing lightning research," commented Ron Holle, Lightning Research Meteorologist at Vaisala.

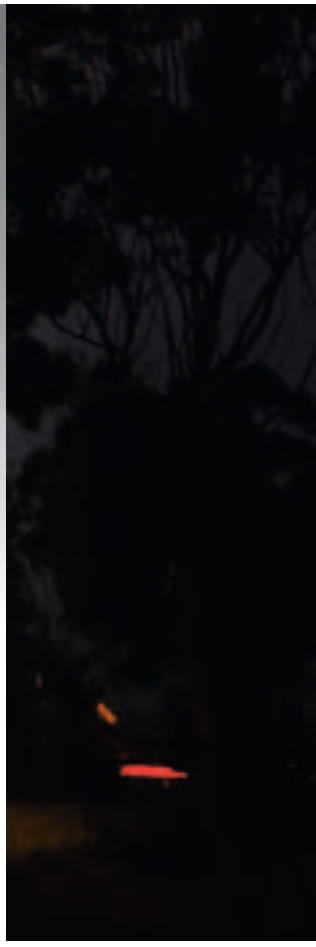
"Nowcasting and forecasting experiences and techniques, severe weather, tropical weather, climatology and incorporation of lightning into numerical weather prediction models demonstrate the value that lightning information has on safety and asset protection."

It is estimated that between 8,000 and 24,000 people are killed by lightning globally per year, and 10 times as many are injured. All in all the financial impact of lightning amounts to several billion dollars per year. Science and the continued evolution of lightning detection technology help mitigate damages and reduce the financial and personal effects of lightning.

The ILDC and ILMC conferences continue the long Vaisala-supported practice of bringing together leading world experts in lightning detection research and applications to discuss the latest research findings, and to learn through extensive interactions during the course of the week's meetings. The next conferences will be held in 2014.

Further information:
www.vaisala.com/ILDC





Summer Wildfires in Colorado Started by Lightning

According to Vaisala's STRIKEnet® lightning verification report, the extensive wildfires that plagued the US state of Colorado this summer were caused by lightning. In the case of a fire in High Park, CO, the actual tree that was hit by lightning and initiated the fire was identified. The data within the STRIKEnet® report is provided by Vaisala's US National Lightning Detection Network® (NLDN®).

Dry lightning thunderstorms are often the root cause of wildfires, when there is abundant moisture in the air, but not enough at the surface to result in enough rain to dampen the fires started by lightning.

Vaisala can offer a STRIKEnet® lightning verification report to confirm whether or not lightning was the root cause of ground damage to assets or the start of a wildfire. The report provides details of the number of lightning strikes that hit the ground in an area of interest, and also confirms the time, peak amplitude and polarity of each stroke.

Vaisala Divested Wind Profiler Business to Scintec AG

Vaisala divested its wind profiler business to Scintec AG in order to better focus on the core product lines in its Weather business area. Vaisala continues to offer the world leading LAP wind profilers as components in its integrated weather and decision support system offering, but will no longer have the product in its own portfolio.

The divestment is expected to contribute to increased focus in product development and customer service.

Scintec AG is located in Rottenburg, Germany. The company develops, manufactures and markets atmospheric sensors using optical, radio wave and acoustic techniques.

New Humidity and Temperature Transmitter Series from Vaisala for High Performance HVAC Applications

Vaisala has introduced the next generation of humidity and temperature transmitters for demanding HVAC applications. Combining fit with functionality, the new Vaisala HMW90 Series HUMICAP® Humidity and Temperature Transmitters are designed for indoor environments requiring measurement accuracy and stability that can be depended on.

The Vaisala HMW90 Series comprises wall-mounted humidity and temperature transmitters with a variety of options and features, including special scalings and calculated dew point and mixing ratio parameters. Vaisala's proven HUMICAP® 180R humidity sensor technology, now introduced to HVAC transmitters, guarantees highly accurate measurements and long-term reliability, while innovative design makes the transmitters easy to install, use and calibrate.

For fast and convenient maintenance, the transmitters include an instructive display, which can be hidden behind a solid cover. The front cover slides down, which means that calibration and adjustment interfaces are within easy access without disturbing measurement performance. Field adjustment is done with just a screwdriver and a reference instrument – no special tools or software are needed.

The HMW90 Series will be complemented with temperature-only models and color cover accessories that ensure a modern finish that blends in any space, making it the choice for any HVAC application.

Further information:
www.vaisala.com/HMW90

The transmitters can be easily calibrated without disturbing measurement performance. All it takes is a screwdriver and a reference instrument.

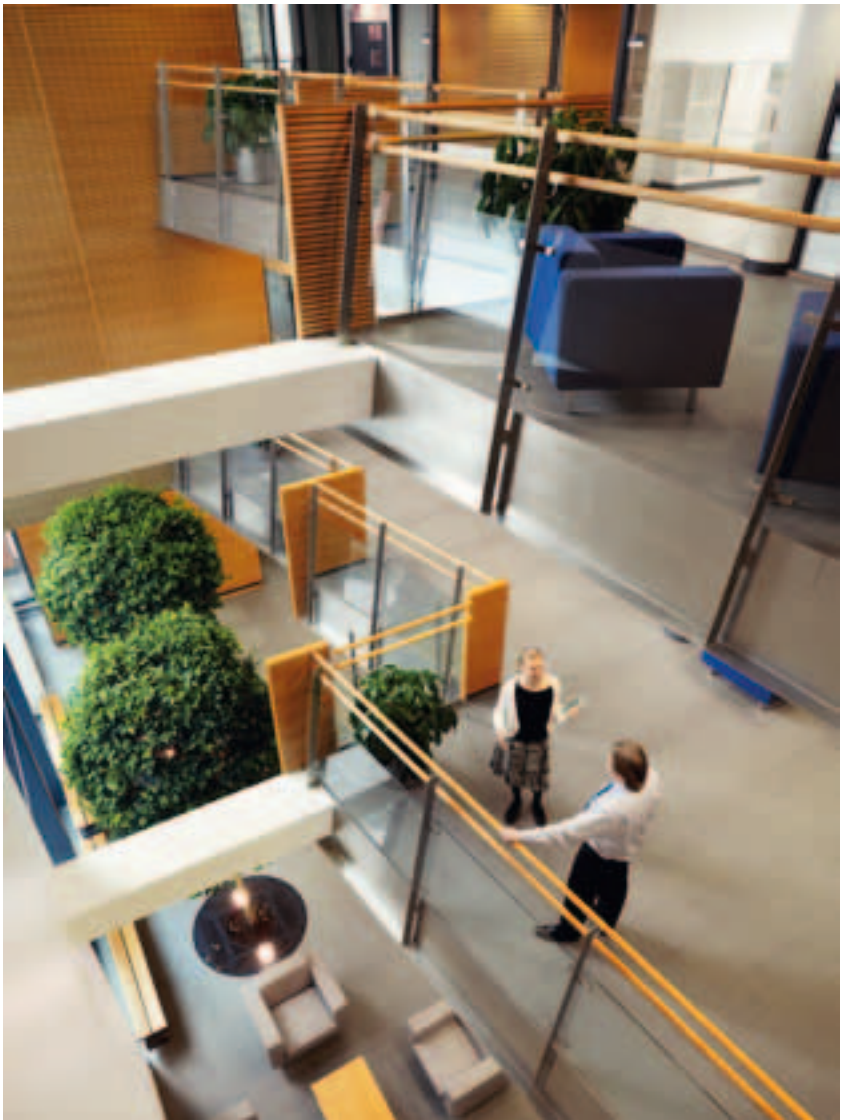
Innovative design makes installing a HMW90 Series HUMICAP® Humidity and Temperature Transmitter easy and straightforward.

Better Roads Award to Vaisala's Online Calculator

Vaisala's RoadDSS Value Calculator won the "2011 Best New Products Top Rollouts" award from Better Roads magazine. With the free online tool, local road authorities can evaluate their potential cost and community savings of using road weather information systems or road decision support systems for winter operations.

The Calculator asks the users 12 questions about road maintenance operations. Once the user has input infrastructure and cost information, the calculator uses embedded algorithms to produce calculated savings based on referenced study findings and regional averages. The report provides a breakdown of all direct and indirect cost savings, including safety and environmental aspects. Users can adjust any of the information they've input into the calculator to better tailor their end report, and they can modify the assumptions made by the application to achieve more localized and accurate results.

The editors of Better Roads award the Top Rollout recognition each year to the products that enrich the highway and bridge construction industry with innovation, productivity and/or greater supplier competition.



Quality Award to Vaisala's Helsinki Office

The city of Vantaa awarded Vaisala's new building in the Helsinki head office site an award for top quality in construction. The award committee stated that the building is a delightful combination of high quality architecture, latest technology and versatile competences in environmental technology, and that it represents modern office architecture at its best.

The architecture portrays the building's ambiance well and brings forward the environmentally sound choices made. For instance, the photovoltaic panels on the building's roof have become a design element in their own right.

The building was earlier awarded a Gold rating in the globally recognized green building rating system LEED, Leadership in Energy and Environmental Design.

New Miniature Dewpoint Transmitter for Small Dryer Applications

New Vaisala DRYCAP® Dewpoint Transmitter DMT143 is a miniature size dew point measurement instrument, ideal for various small industrial dryer applications, such as compressed air and plastic dryers. It can be installed directly into pressurized systems at 50 bar (725 psia) maximum pressure.

Due to its small size and light weight, the DMT143 installs quickly and easily in tight spaces or in small-size pipelines. The sensor fully withstands getting wet, and therefore performs well also in applications that occasionally experience process water spikes, such as pipeline condensation during a system failure or start-up. The sensor is also highly resistant to particulate contamination, oil vapor and most chemicals.

Further information:
www.vaisala.com/dmt143

Structural Humidity Kit for Borehole Measurements

Concrete dries unevenly and is usually drier on the surface, which means that when measuring humidity in a concrete structure, it is important to go beneath the surface conditions. In a borehole measurement method, a humidity probe is left in the borehole until the humidity in the hole has reached an equilibrium state, and the stabilized values can be read.

Ideal for the borehole method, the new Vaisala HUMICAP® Structural Humidity Measurement Kit SHM40 offers an easy, reliable and durable solution for humidity measurements in concrete and other structures. A basic starter kit is comprised of a measurement probe, indicator and accessories for the borehole method in a weather-proof case, convenient for use in construction sites. The measurement probes are interchangeable, and connect easily to the indicator with a snap-on connector, which enables convenient use of multiple probes with one indicator.

Additional accessories can be used to prepare a moisture measurement hole in fresh concrete, eliminating the need for drilling and the risk of damaging heating elements or tubing embedded in the concrete.

Further information:
www.vaisala.com/shm40

24/7/365 Customer Support Centers Established

Vaisala's technical support function is undergoing focused development efforts to improve the speed of response to customer contacts and overall service quality. As a part of the effort, dedicated 24/7/365 support centers are set up in Vaisala's offices in Tucson, AZ, USA and Birmingham, UK to serve as front-line contact centers for all customer support matters. They will be staffed 24 hours a day to ensure that issues and problems are resolved as soon as possible.

"We are committed to delivering world-class service. My team here will be available to help whenever the customer needs it, and if they can't fix the problem, they will make sure the customer is connected to someone who can. The support center staff will take personal responsibility for making sure that all problems are resolved to the customer's satisfaction," says Duncan Wright, manager of the center in Tucson.

The same customer-focused attitude will be embedded in the culture of the Birmingham support center. Glen Nicholls, its manager, is very clear on what he wants for their customers: "I don't just want customers to be pleased with our response, I want our Technical Support services to be truly world-class."

The centers will be supported by second-line teams across the world. Ongoing feedback will be seeked

from customers to ensure that the quality of service is continuously improving and meeting their requirements.

Further information:
www.vaisala.com/service

Simple & Easy Cold Chain Logging

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