THE INTERNATIONAL REVIEW OF WEATHER, CLIMATE AND HYDROLOGY TECHNOLOGIES AND SERVICES

Meteorological

TECHNOLOGY INTERNATIONAL

FULL PREVIEW OF THE LARGEST EVER **METEOROLOGICAL TECHNOLOGY WORLD EXPO 2017**, OCTOBER 10-12 AMSTERDAM

SOLAR ATTRACTION

Can we forecast magnetic storms to prevent catastrophe?

TOP OF THE CROPS

Sensors, drones and data modeling are helping farmers protect valuable crops and increase yields

SMARTER SATELLITES

Experts assess the technology on board the latest weather satellites and reveal their value to meteorology

PRODUCT LAUNCH

BETTER TOGETHER

Following the acquisition of Lufft last year, OTT Hydromet Group now provides a complete range of harmonized solutions to suit hydro-meteorological measurement networks. Hydrological sensors from OTT, environmental metrology from Lufft, dataloggers from Sutron, software from MeteoStar and smart wireless telemetry solutions from ADCON, all work together to meet the most demanding of hydrological and meteorological monitoring applications.

At this year's Meteorological Technology World Expo, Lufft will present its innovative VS100k visibility sensor to the public for the very first time. The sensor covers a large range of 100km (62 miles) by means of its state-of-the-art forward scatter light principle. Interested parties have the opportunity to participate in a hands-on training session at the group's stand, where the product manager will explain how the device is installed and connected. The group will also be demonstrating its complete weather station, comprising a solar-powered all-in-one WS800 weather sensor and VS20k visibility sensor from Lufft, linked to a GPRSLink Mini datalogger from Sutron. The data will be issued by the MeteoStar software live on a screen. The compact WS800 covers eight parameters at once, including lightning, wind and precipitation. The new VS20k is a visibility sensor with a range of 20km (12.4 miles).

Visitors will also be able to view the OTT Pluvio²S, a highly accurate, robust and maintenance-free precipitation sensor meeting the strict requirements of the WMO. It is well-suited for meteorological measurement networks, flood warnings and rainfall-run-off modeling systems.

OTT HYDROMET GROUP
STAND 8080

Ingeniería, Geofísica Y Sistemas, S.A. De C.V., Mexico

FIRST-TIME EXHIBITOR

POWER ANYWHERE

First-time exhibitor Leading Edge Power will demonstrate its new off-grid power system, the PowerBox. Designed for operating low-power AC or DC equipment, the PowerBox provides everything needed from a remote power source, neatly fitted into a single, pallet-sized box. Easy to transport and quick to deploy, the user can setup a complete solar-wind hybrid power supply in less than an hour, with the option of an auto-start backup generator, or even a methanol fuel cell.

Customers include the UK Met Office, Central Institute for Meteorology and Geodynamics in Austria, Met Eireann, Meteorological Service of Canada, Icelandic Meteorological Office and British Antarctic Survey.

Off-grid power systems are essential in remote locations, where no grid connections are available, or where the cost of connecting to the national grid is simply too expensive. Common applications typically include off-site telemetry equipment, such as remote meteorological monitoring, seismological surveys and environmental monitoring.

Leading Edge Power uses British-made wind turbines and combines these with solar panels, DC battery banks, inverter-chargers and even backup generators, which can be programmed to start and stop automatically if battery levels should get too low.

As well as horizontal axis wind turbines, the company manufactures two vertical wind turbines, the LE-v50 and LE-v150, which can withstand storm force winds that would otherwise destroy a traditional wind turbine. These are ideal for powering equipment sited in mountainous areas, by the coastline or offshore. The Extreme version of the LE-v50 and LE-v150 are proven in the severest environment, the Antarctic, and have been designed to withstand winds up to 45m/s (100mph).

LEADING EDGE POWER
STAND 8062

FREE TO ATTEND!

REGISTER NOW

www.MeteorologicalTechnologyWorldExpo.com

SOMETHING IN THE AIR

PlairGrid from Plair, a manufacturer of instruments for real-time airborne particle detection, has been purpose-built to benefit allergy professionals, as well as meteorological and environmental services, by providing a more affordable solution for the automatic detection of pollen.

The solution leverages Plair's all-optical Rapid-E instrumentation, which is powered by artificial intelligence, to automatically identify and count the most common allergenic pollen species in real time.

Rapid-E is free of any software or dataloggers and is easy to use. Analyzed real-time data is delivered to an online dashboard – PlairGrid – which enables users to view and manage hourly and daily counts of different pollen types together with total pollen and particle count.

Plair's real-time pollen information improves forecasting models with better predictions compared with current weekly forecast, leading to a better quality of life for allergy sufferers.

PLAIR
STAND 4045

FACT

The show is expected to attract almost 180 exhibitors and 4,000 attendees from 100 countries

NEW TECHNOLOGY

SOLAR RADIATION MEASUREMENT

Hukseflux Thermal Sensors from the Netherlands is planning to usher in the next generation of solar radiation sensors at this year's Meteorological Technology World Expo by showcasing its range of SR30 and SR05 pyranometers. Hukseflux gave a sneak preview of the SR30 at last year's show and it will now be unveiled with all its features.

With recirculating heating and ventilation (RVHTM) as part of its standard configuration, SR30 offers the highest measurement accuracy and data availability, outperforming all pyranometers with traditional ventilation systems. SR30 is the first pyranometer compliant with Class A requirements of the new IEC 61724-1 standard for photovoltaic (PV) monitoring. Besides irradiance, SR30 offers remote diagnostics such as tilt and humidity measurement as outputs. The pyranometer is also supported by the worldwide Hukseflux calibration and servicing organization.

The affordable second-class SR05 pyranometer, with unique ball levelling, is aimed at general solar radiation measurement in large (agro-)meteorological networks. Already connecting via Modbus over time-to-live (TTL), Modbus over RS-485, 0-1 V and/or 4-20 mA, this year new outputs will be introduced.

Also new to market are the Hukseflux SRC02 indoor calibration systems for pyranometers, which have already been installed on five continents. Based on the ISO 9847 type IIc calibration method, SRC02 systems are great for calibration laboratories and for users operating a large number of pyranometers. SRC02 offers several benefits over competing systems, including indoor all-season calibration for all common pyranometer brands, automated quality assurance, and a small area footprint without the need for a dark environment or additional air-conditioning.

In the lead-up to, and during the event, Hukseflux will offer guided tours of its state-of the-art research and development, manufacturing and calibration facilities in Delft.

HUKSEFLUX THERMAL SENSORS
STAND 7080

by Helena Wingert, content specialist, Lufft

SOLAR TRACKING

Energy farms depend on meteorological sensors to ensure that solar panels are facing in the optimal direction

The need to conserve natural resources and reduce the impact on the environment has driven a switch to renewable energy sources around the world. Presently solar power covers a minor portion of global energy demand, with photovoltaic farms generating approximately 1% of the world's total power supply.[1] However, in a few years this could look different thanks to the increased power conversion efficiency of solar cells and the decreased acquisition costs.[2] If the sun's energy is harnessed efficiently, it is estimated solar power alone can deliver more than 2,500TW of energy.[3]

SITE ASSESSMENT

The efficiency and financial success of a solar farm are dependent on the location and panel alignment. Site decisions can be influenced by legal, environmental, technical and financial issues. However, once a site has been chosen, remote sensing techniques such as weather stations, and multicriteria decision-making methods can be used to evaluate the location.[4]

The assessment target is to calculate the number of sunny days, average wind strengths and average precipitation, which could influence or harm solar panels. In the end, the decision is made on the maximum energy output versus the installation costs.

SENSORS FOR SOLAR MONITORING

Following installation, solar farms need to be continuously monitored using high-quality autonomous sensors. Solar trackers are used to ensure that the panels are positioned correctly and use smart sensors to reliably detect factors such as radiation, snow layers and precipitation. Such sensors also need to be durable, as the life expectancy of modern solar panels is greater than 35 years.[5]

Lufft's all-in-one weather sensors (WS) meet these requirements, are easy to install and operate, and only require one cable for the data connection and power supply. Each sensor can also be adapted to meet the needs of different photovoltaic markets and customers, meaning that units supplied without an integrated radiation sensor can be connected to an external sensor instead.

Lufft has equipped 13 of its compact weather sensors with pyranometers. This includes fixed and tiltable CMP3 Second Class and fixed CMP10 Secondary Standard models from Kipp & Zonen, as well as a silicon pyranometer developed in-house.

Lufft's WS510, WS503 and WS501 models include a humidity, wind, air pressure and temperature sensor in addition to the pyranometer. The WS models without integrated radiation sensors can be easily connected to standard radiation sensors,

Lufft's all-weather sensor at the Virginia National Guard's training institute at Fort Pickett

as they deliver data in the form of an open UMB protocol.

SHM31 SNOW DEPTH SENSOR

In addition to multiparameter weather and radiation sensors, optical snow depth sensors like the SHM31 help to maximize the efficiency of photovoltaic systems. They determine solar tracker positions and prevent snow-related incidents. They also measure snow layers up to 49ft (15m) deep and distinguish snow from other surfaces. It runs 400,000 hours maintenance-free, its entire lifetime.

SITE APPLICATIONS

The Virginia National Guard constructed a solar installation at its Regional Training Institute (RTI) at Fort Pickett, Virginia. The 488kW solar array provides the RTI with nearly 80% of its daytime energy needs.

The solution uses a Lufft weather sensor to gather data on wind speed, wind direction, temperature, humidity and air pressure. The weather station and pyranometer provide weather and solar radiation data, which is integrated into a Building Automation System and displayed on a management dashboard.

IMPERIAL VALLEY

Imperial Valley in Southern California is characterized by very hot summers and mild winters. With an average temperature of 31.6°C (88.9°F) and a minimum of eight hours of sunlight per day, the region is ideal for solar energy.

To take advantage of this location, the Imperial Valley Solar Company (IVSC) built the largest photovoltaic power plant in the region. Five plants are planned for Imperial Valley. Trimark Associates, a partner of Lufft and supplier of measurement and communication solutions planned, implemented and monitors the solar plant.

The 200MW solar plant required two meteorological stations for monitoring ambient temperature, wind speed, wind direction, humidity, air temperature, solar radiation and surface temperature. To achieve this, Lufft's WS500-UMB and WS503-UMB weather stations were incorporated as part of the project.

The California Independent System Operator (CAISO) monitors the operation of the statewide power grid. It requires all grid-connected solar resources that generate more than 1MW to have at least one weather station.

"The Imperial Valley solar plant was not built to include meteorological stations," explains Robert Hinchman, regional director at Trimark Associates. "Instead of installing a fiber-optic cable between the control room and the MET stations, we recommended connecting the devices to the Remote Intelligent Gateway via a secure radio frequency. This approach allows us to transfer to CAISO the data while minimizing the cost of construction."

AURORA 150MW SOLAR POWER PLANT IN MINNESOTA, USA

Aurora Solar is a 150MW project with 16 sites across the state of Minnesota. Once complete, the project will save more than 100,000 tons of CO_2 annually and will have an economic impact of US$21m.[6]

Solar trackers ensure that the panels are aligned the best way to maximize energy production by means of an automatic control program. To achieve this, the system needs to know the exact sun position, which is delivered by solar radiation sensors.

Lufft's all-in-one WS600 weather sensors were deployed as solar trackers at each of the 16 sites to ensure the panels are aligned in the best way possible to maximize energy production. The smart sensors monitor wind velocity, wind strength, precipitation, relative humidity, air pressure and temperature. ▮

REFERENCES

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5) Solangi et al., (2011); Tsoutsos et al., (2005); Torres-Sibille et al., (2009); Hernandez et al., (2014)
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Lufft WS302 all-in-one weather sensor

Virginia National Guard

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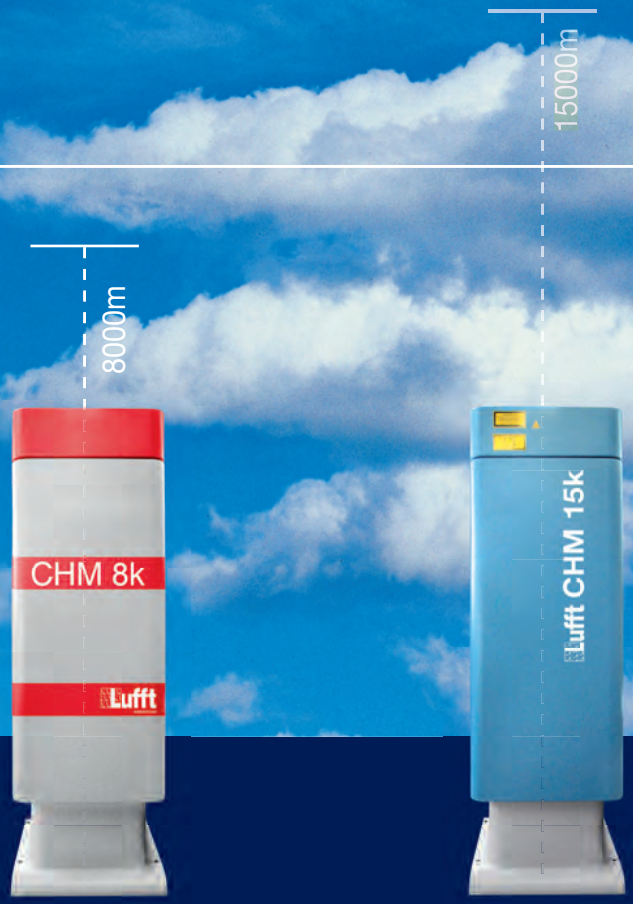

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