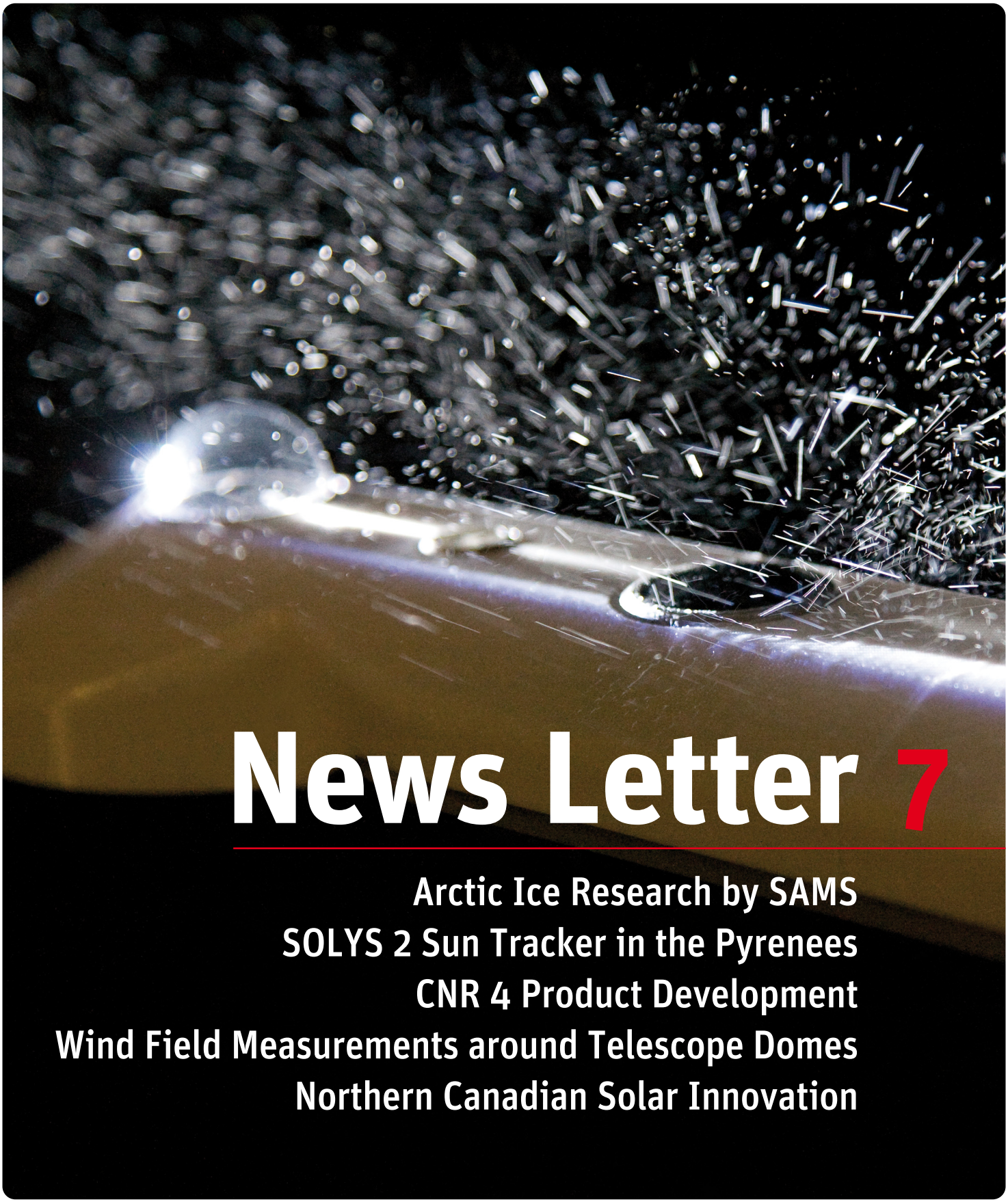

News Letter 7

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KIPP & ZONEN
SINCE 1830

Content

January 2009

Contact

If you have a news item for the news letter or want to share your experiences with Kipp & Zonen applications and contribute to our next issues, please e-mail the editor: kelly.dalu@kippzonen.com

Successful Debut of SOLYS 2 Sun Tracker

2008 has been very successful for Kipp & Zonen, with several new product introductions. Starting with the SOLYS 2 sun tracker in the beginning of the year. A successful launch of which we now have delivered over 45 units.

The new CHP 1 pyrheliometer has replaced the CH 1. In December, at the American Geophysical Union (AGU) Fall Meeting in San Francisco we revealed the working prototype of our new CNR 4 net radiometer. This meeting attracted more than 15,000 visiting geophysicists and covered topics in all areas of Earth and space sciences. The introduction of the CNR 4 to replace the well-known CNR 1 was very much welcomed.

The Kipp & Zonen International Sales Meeting was held during the last week of October in Malaga, Spain. It was a great event with 43 people attending. Emilio de Ugarte and Lidia Torres of Dilus Instrumentación y Sistemas SA, our distributor in Spain, made a huge contribution to the organisation and the success of the meeting; for which I am very grateful.

The expectations for 2009 are mixed. Mixed, because we do not know what the global financial and economic developments will be. However, we are sure that the new instrument introductions and improvements to existing products planned for the year will be well received and that the interest in climate research, agriculture optimisation and renewable energy will continue to grow. We confidently expect the CNR 4 net radiometer to do as well in 2009 as the SOLYS 2 did in 2008.

I wish all readers a healthy and prosperous 2009 ■

Yours sincerely,

Ben Dieterink, President
Kipp & Zonen BV

Winner of the Kipp & Zonen Award

And the Kipp & Zonen Award 2008 goes to...

Ulrik Smith Korsholm

Meteorological Model Systems, Research Department, the Danish Meteorological Institute (DMI) for his paper "On the importance of urban-aerosol-meteorology feedbacks in pollutant transformations"

Ulrik Smith Korsholm receiving his Kipp & Zonen Award

Receiving his award, Ulrik said: "It is a great privilege to have received the Kipp and Zonen Award and it certainly inspires further work in boundary layer research." The award was granted based on the paper he presented at the annual meeting of the European Meteorological Society in Amsterdam, 2008.

One of the greatest uncertainties in current weather and climate models is their representation of aerosol-cloud interactions. Clouds form in ascending air as it saturates and water vapour condenses on sub-micron aerosols. Herein lies great potential for anthropogenic hygroscopic aerosols to modify cloud properties. The presence of anthropogenic aerosols in an ascending air mass leads to smaller cloud droplets and affects cloud albedo and precipitation efficiency. The resulting changes in precipitation and in the surface radiation budget lead to a redistribution of the aerosols as well as changes in gas and aerosol chemistry. Due to computational constraints such feedbacks are currently not included in weather forecast and climate models.

Integrating a gas-chemistry and aerosol model into DMI's operational weather forecast model has allowed us to investigate the importance of such feedbacks on short timescales. Comparing model simulations with and without feedbacks has shown that they are of great importance in the particular meteorological case considered. Since short-range weather forecasting and climate prediction are key issues at DMI, research into aerosol-cloud interactions are of great value. Other key activities include monitoring of weather, climate and environmental conditions, including air pollution and emergency preparednes ■

News Update on Products I

2AP Firmware Update

Following on from the development of the SOLYS 2 sun tracker, we have been able to update and improve the sun position algorithm used in the 2AP.

The original algorithm in the 2AP can lead to a build-up of errors in the calculated sun position that would need to be corrected every few years by putting offsets into the setup or by realigning the tracker.

All new 2AP sun trackers have had the improved algorithm since October 2008. An update kit is available consisting of a new memory chip for the 2AP controller board and fitting instructions.

SOLYS 2 Shading Ball

The shading ball assembly for the SOLYS 2 is delivered with two balls on adjustable rods. Normally, one is for a pyranometer to measure diffuse solar radiation and the other is for a pyrgeometer to measure down-welling far infrared radiation.

For customers who wish to mount a third shaded radiometer an additional rod and ball can be supplied as an accessory.

The crossbar of the shading assembly already has a mounting position for it ■

Arctic Ice Research by SAMS for the International Polar Year

The International Polar Year (IPY) is a large scientific programme focused on the Arctic and Antarctic from March 2007 to March 2009 (to cover 2 complete annual cycles). It represents one of the most ambitious coordinated international science programmes ever attempted. Over 200 projects are designed to explore the impact of climate change and the strong links these regions have with the rest of the globe. Previous IPYs were in 1882-3, 1932-3 and 1957-8. The Scottish Association for Marine Science (SAMS) is a partner in many of the Arctic IPY projects.

The Uncertainties of the Arctic Environment

The Arctic has a major influence on global climate and is the fastest warming region of the globe. The delicately balanced eco-system is particularly vulnerable to natural and man-made impacts. In the summer of 2007 the ice shrank to the lowest area on record and in 2008 there was extensive open water less than 500 miles from the Pole at 83 degrees North.

Four Free-Drifting Stations

Every summer from 2003-2008 an international team of 24 scientists set out on a five week cruise on the Canadian Coastguard flagship, the heavy ice-breaker Louis S. St. Laurent. Their mission was to study sea ice in the Arctic Ocean, to monitor the effects of climate change and the shrinking ice cover. The major contribution of SAMS was to design and build a suite of instruments to measure the flow of heat between the sea, the ice and the atmosphere at temperatures down to -50 °C.

SAMS deployed four autonomous stations to support in-situ observations of the Arctic Synoptic Basin-wide Oceanography program. These free-drifting stations are installed on ice floes to observe key environmental parameters, including the temperature at various depths in the ice, meteorological variables and solar radiation. Measurement of the four components of the radiation balance are provided by a Kipp & Zonen CNR 1 net radiometer mounted at a height of 2 meters above the ice. Two stations feature a novel Conductivity/Temperature/Depth (CTD) package with an automatic winch developed by SAMS to make hydrographic measurements from just below the ice to the ocean floor.

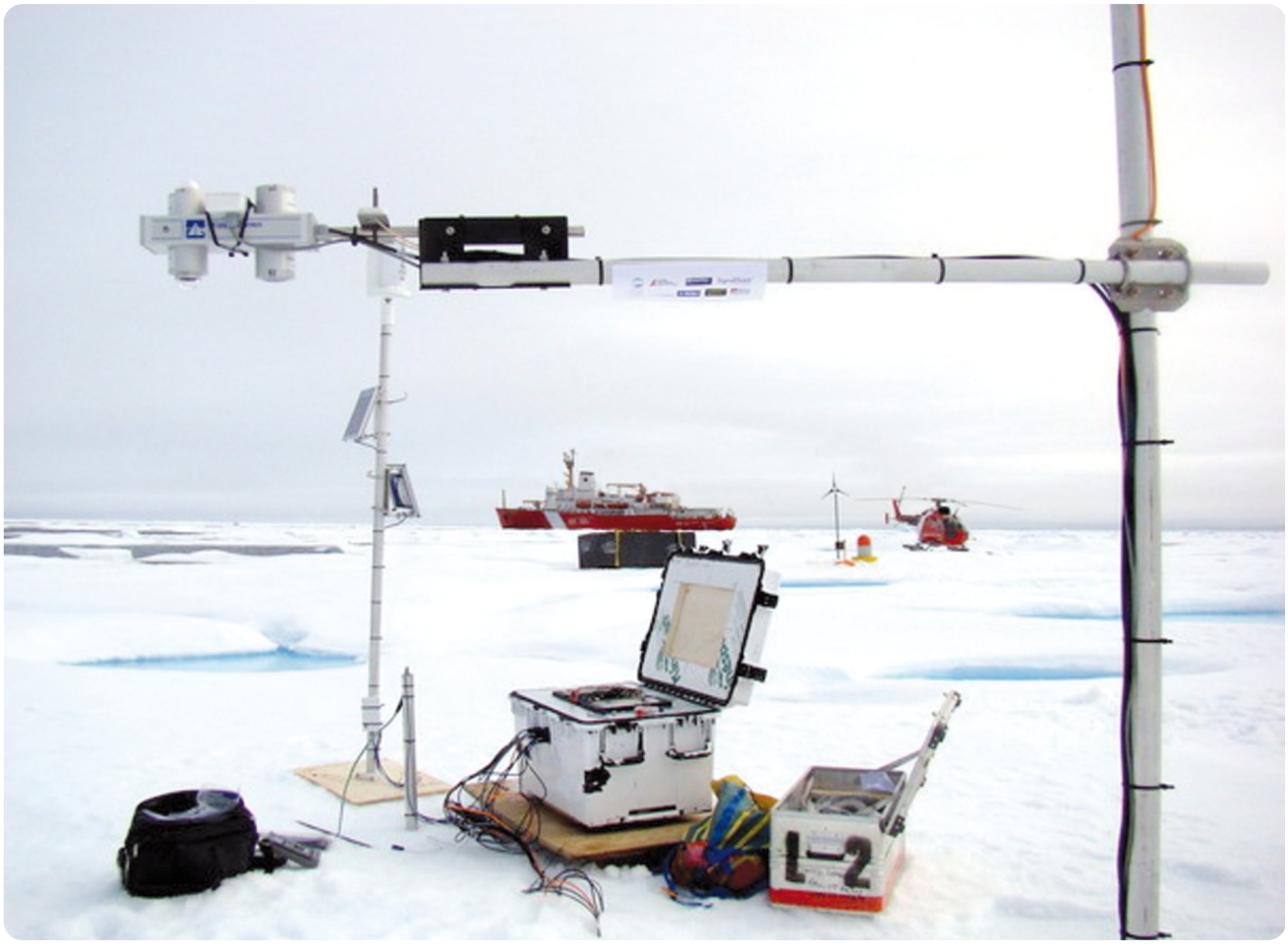
The equipment is powered for up to two years using batteries backed up by solar panels. A webcam at each site records twice-daily images of surface conditions. Data, commands, image 'thumbnails' and diagnostics are transmitted in near real time via the Iridium satellite system, with the option to request full-resolution images as required. The equipment was designed under the leadership of David Meldrum, who is a specialist in glaciology, oceanography and technology and is the only UK member of this IPY project team.

To quantify the energy balance David needed to measure incoming and reflected solar radiation, down-welling and up-welling far infrared radiation and to calculate albedo and energy fluxes. For this he required a high quality, reliable instrument with proven performance in polar conditions. Like many other scientists involved in research in Polar Regions and on glaciers, David chose the Kipp & Zonen CNR 1 net radiometer as a key component of the SAMS monitoring package.

The results of the project will be used to improve our ability to forecast the future of the sea ice and the resulting impacts on the animal and human population for whom the ice is the key to survival.

References

For more information on SAMS or the ice monitoring project go to www.sams.ac.uk or www.whoi.edu/beaufortgyre



Northern Canadian Solar Innovation

An innovative solar energy installation, optimised for cold northern climate, is being installed at Concordia University's campus in downtown Montréal, Quebec, Canada. Mr. Brendan O'Neill of Concordia University and the Canadian Solar Buildings Research Network explains, "The John Molson School of Business (JMSB) building will use a single façade surface to generate both heat and electricity from the sun; the first of its kind in Canada." This type of solar installation is referred to as a Photovoltaic/Thermal (PV/T) application.

Renewable energy generation using radiation from the sun is usually carried out in two forms; electric generation using photovoltaic cells (PV) and thermal generation heating air or water (T). The delivery of thermal energy at the right time and temperature can be problematic. Heat may not always be needed, and the temperature-specific nature of any water application – taking a shower or boiling water – means that during the cold Canadian winter the available heat may not meet the requirements.

Converting the sun's rays to electricity, however, can be 3 to 4 times less efficient than thermal conversion. Therefore, design of a solar energy project must consider the type of energy required, the end use, and attempt to maximise efficiency by balancing thermal and electric systems. The combined generation of heat and electricity optimizes the useful energy generated from the sun, producing three times more heat than electricity.

The JMSB building system does not use thermal energy to heat water. It pre-heats fresh air as it enters the building to warm the interior, ensuring that all the thermal solar heat is recovered as usable energy (see Figure 1). The fresh air is drawn in around the photovoltaic panels that create the electricity and these are cooled by the incoming cold air. As is commonly known, cooling electrical equipment, such as computer chips, generally increases the electrical performance. The same is true for photovoltaic panels.

To help determine the efficiency of their system, and for other research projects, a Kipp & Zonen SOLYS 2 sun tracker will be installed on the roof of the JMSB building in order to measure the available solar radiation. The instruments mounted on the SOLYS 2 will measure both direct & diffuse radiation. Knowing this, researchers can calculate how much of the radiation they are converting into usable energy.

The ability to generate heat and electricity at the site of consumption eliminates the costs and losses inherent in off-site generation. These include electric power line transmission losses, the energy required to pump oil and to compress natural gas. Building integrated renewable energy systems allows for the construction of buildings that can provide their own heat and electricity, while relying less on external sources.

On sunny days during the heating season, large amounts of fresh air can be heated with a temperature increase of about 20°C. This low temperature application of fresh-air heating has high-energy recovery efficiencies, and for institutional buildings such as the JMSB, fresh air is always required. The warmed air is then delivered to the building HVAC system, where it is further heated, if required.

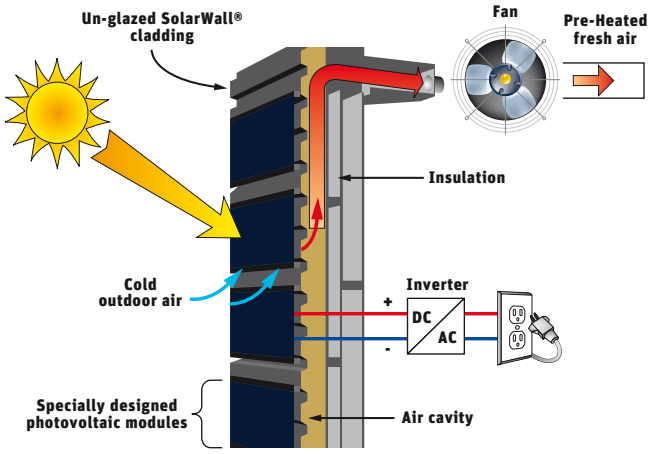


Figure 1. Process of pre-heating fresh air as it enters the JMSB building

A large amount of the heat supplied to the fresh air is removed from the photovoltaic panels. This heat removal will increase the total number of watts produced by each panel. Typically, the efficiency of the PV panels can be increased by 5% on cold sunny days, compared to a traditional installation. This installation will allow for the production of approximately 110 MW-hr per year, displacing both natural gas and electricity from the grid.

This innovative installation will be continuously monitored, with the help of Kipp & Zonen instruments, to properly quantify the annual energy produced, and to determine the applicability of future projects in Canada.

Since 2001 Campbell Scientific Canada (CSC) has been the exclusive distributor for Kipp & Zonen products in Canada. CSC has been in existence for 30 years: 2008 being our

anniversary year. “Our decision to partner with Kipp & Zonen was an easy one, as Kipp & Zonen sensors have long been known for their quality construction and long-term stability within the solar radiation community,” says Carl de Leeuw, Marketing & Product Manager at CSC.

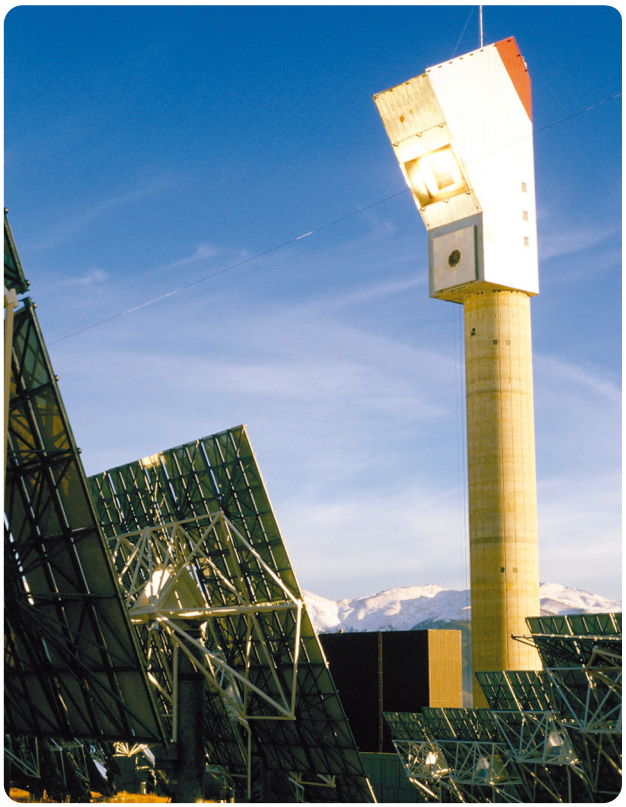
The CSC organization is comprised of 41 people, 12 of whom have the ability to support Kipp sales and service questions directly. The entire sales and support team is lead by our sales Manager, Mr. Greg Kalmbach while the Kipp & Zonen line is specifically taken care of by Ms. Danielle Romanick. It is through the efforts of this team that Kipp & Zonen products have become readily accepted and play an important role in many projects throughout Canada.

To learn more about this project please visit:
www.solarbuildings.ca ■

Ms. Danielle Romanick oversees the Kipp & Zonen line at Campbell Scientific

SOLYS 2 Sun Tracker in the Pyrenees

Since 2006, CNRS-PROMES, a leading centre for concentrating solar systems, has been working on a project called PEGASE (Production of Electricity from Gas and Solar Energy) which aims to design and evaluate an innovative hybrid system that combines solar energy and gas-turbines for electricity generation. The project is taking place at the Themis solar test site near Targasonne in the Eastern Pyrenees.



Recently, a SOLYS 2 sun tracker and a set of solar sensors (for global, direct and diffuse radiation measurement) have been installed on the top of the 100 meter high tower, facing the field of 201 concentration mirrors. Together with other meteorological sensors, Kipp & Zonen instruments will help the researchers and energy companies to precisely characterise the site, to control parts of the installation (such as the heliostats and the solar receiver) and to analyse the efficiency of the complete system.

Improving solar energy efficiency

With this experimental project, CNRS-PROMES is looking in the near future to improve the efficiency and reduce the costs of generating clean solar energy ■

Wind Field Measurements around Telescope Domes

The Dutch Open Telescope (DOT) in La Palma and the GREGOR telescope in Tenerife, are two optical telescopes used to study the processes on the surface of the sun. Both telescopes are covered by an innovative dome, made from flexible cloth with a tensile frame structure. Unlike most traditional telescope domes made from metal, these domes can be completely opened. This has many advantages. Most importantly, the telescope is surrounded by free air that does not come into contact with surfaces (the dome) of a different temperature, which could cause distortions of the image. Furthermore, the unobstructed air movement brings natural cooling to the main mirror of the telescope.

Nine pairs of cup anemometers and vane direction sensors are installed around each telescope to conduct wind field measurements. Eight are evenly spaced around the dome and one is positioned on top. The most interesting data is measured during the winter storms and the weather conditions of the Canary Islands demand high quality weather resistant equipment. For these reasons Mierij Meteo wind sensors models 067 and 660 were chosen for the most important measurement points, with the lower cost models 444 and 555 at other locations. At the DOT site there is also a Gill 3-axis ultrasonic anemometer. The ultrasonic measurement technique is perfect for the measurement of wind speed with a high time resolution. However, this technique is sensitive to surrounding noise and therefore is less suitable in rain and close to buildings, or telescopes, when there is a strong wind.

All the sensors at the DOT and GREGOR sites are read out with a time resolution of approximately 15 Hz, 24 hours a day. The data is stored for later analysis and is also displayed graphically, in real-time, at the observatory. The wind field and the weather conditions have a large influence on the quality of the observations, so the observers find the displayed information extremely useful.

The domes of the DOT and GREGOR telescopes have been in use for several years and have lasted through hurricanes with wind speeds up to 67 m/s. The domes have also proven to be resistant to heavy icing during the winter.

The innovative design has proven itself to be a success and more telescopes are planned to be equipped with similar domes in the future.

The measurements on the domes are part of a research program for the development to larger size domes, which require precise numerical calculations. Deformation measurements of the two prototype domes combined with the wind measurements will provide checks for the developed numerical simulations. This research is supported by the Dutch Technology Foundation STW.

More information can be found on the Dutch Open Telescope website: http://dot.astro.uu.nl

Mierij Meteo specialises in wind measurement solutions and will be at the 2009 European Wind Energy Conference in Marseille, France, from 16 to 19 March on stand number 3226 ■

CNR 4 Product Development

One of the most successful instruments in the Kipp & Zonen product portfolio is the CNR 1. This is the only integrated 4-component net radiometer on the market and has been providing customers with a high level of performance for many years. However, technology has evolved and improvements can be made, so development of a replacement is under way.

Net Radiometers are used to measure the energy balance between incoming short-wave and long-wave Far Infrared (FIR) radiation versus surface-reflected short-wave and outgoing long-wave radiation.

The CNR 1 net radiometer consists of a pyranometer pair, one facing upward, the other facing downward, and a pyrgeometer pair in a similar configuration. The pyranometer pair measures the short-wave radiation and the pyrgeometer pair measures long-wave radiation. An integrated temperature sensor provides information to correct the infrared readings for the temperature of the instrument housing.

CNR 4 improved features

CNR 4 will be our replacement for the CNR 1 and is focused on improving the ease of use and the operational performance. The upper long-wave detector of CNR 4 has a meniscus dome. This ensures that water droplets role off easily and improves the field of view to nearly 180°, compared with a 150° for a flat window.

All 4 sensors are integrated directly into the instrument body, instead of separate modules mounted onto the housing. Care has been taken to place the long-wave sensors close to each other and close to the temperature sensors. This assures that the temperatures of the measurement surfaces are the same and accurately known. This improves the quality of the long-wave measurements.

The new design is much lighter in weight and has an integrated sun shield that reduces thermal effects on both long-wave and short-wave measurements. Each CNR 4 will be equipped with both Pt-100 and 10K thermistor sensors to measure the housing temperature. The cables are yellow with waterproof connectors as used with all our new radiometers. The mounting rod can be unscrewed for transport, like the CNR 2.

An optional ventilation unit with heater is designed as an extension of the sunshield and can be fitted new to the CNR 4 or retro-fitted later. This unit is compact and provides efficient air-flow over the domes and windows to minimise the formation of dew and reduce the frequency of cleaning. The integrated heater can be used to melt frost.

The CNR 4 will become available in April 2009 and, due to improvements in design and efficiency in production, the price will not be higher than the CNR 1 ■

International Sales Meeting 2008, Malaga, Spain

This year the Kipp & Zonen International Sales Meeting was hosted by our Spanish distributor, Dilus Instrumentación y Systemas in Malaga, the birthplace of Pablo Picasso. The beautiful AC Hotel Palacio in the centre of the city was the main venue for this three-day event.

At this event we brought together our representatives around the world to share our latest activities, developments and future plans. This year the group included distributors from all over the globe; Japan, Lithuania, Canada, Norway, Brazil, South Africa, and many more countries. The success of the meeting was inherently connected to the mixture of cultures, the common goals that we share and the great atmosphere.

We would like to thank everyone for joining us and for their active participation. Everyone agreed that this was our most successful International Sales Meeting so far, and we are very grateful to Emilio de Ugarte, Lidia Torres and the Dilus team for the organization of a fantastic occasion. We hope to see you all next year at a destination still unknown.

Hasta Luego ■

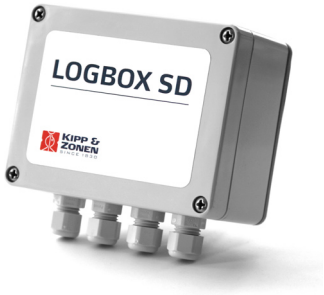
News Update on Products II

CVF 3 Ventilation Unit

The CVF 3 replaces the CV 2 from January 2009. The price is the same but there is now the convenience of a plug-in cable and an output signal to monitor the fan operation.

LOGBOX SD

This very affordable and flexible new data logger is already being delivered to customers and includes a bracket for mounting the logger to masts. It is ideal for portable use in field measurements and is compatible with all Kipp & Zonen solar radiation instruments ■



Fairs & Events

AMS - Phoenix - USA	11 - 15 Jan '09
EGU - Vienna - Austria	19 - 24 Apr '09

Our representatives from all over the world at the International Sales Meeting 2008, Malaga, Spain

Passion for Precision

Kipp & Zonen is the worldwide authority in measuring solar radiation and atmospheric properties. Our passion for precision has led to the development of a large range of high quality instruments: from all weather radiometers to complete measurement networks.

We promise our customers guaranteed performance and quality in various markets: Meteorology, Climatology, Hydrology, Industry, Renewable Energy, Agriculture and Public Health & Safety. We hope you will join our passion for precision.

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