

about 1.5 hours south of Oslo. This was the 29th edition of the event, which is held annually, and alternates between Scotland and Norway.

The Workshop has a distinctly international flavor and, in 2011, featured 330 delegates from 29 countries. While most attendees were from European countries, other countries represented include India, Nigeria, Oman, Qatar, Singapore, and the United States.

The main focus of the Workshop was on the presentation of papers on various topics related to flow. The Workshop also featured sessions where different flowmeter suppliers presented solutions to industry applications, and these were conducted simultaneously. An exhibit room featured displays by KROHNE, Elster, SICK, Cameron, and other suppliers. Nearly all the papers related to multiphase or ultrasonic flowmeters, although several were given on Coriolis flowmeters as well. The Workshop clearly has a flavor of a conference rather than an exhibition.

The 2012 North Sea Flow Workshop will be held Oct. 23-26 in Scotland.



While technical presentations have moved to the forefront of most flow measurement-related events, there is still generally a product exhibition element where suppliers can interface with end-users to discuss their latest product offerings.

Photo courtesy of Flow Research, Inc.

The Role of CMR & NEL in the North Sea Flow Workshop

CMR Instrumentation (cmr.no/cmr_instrumentation/index.cfm), a business unit of Christian Michelsen Research AS (CMR), is significantly involved as a sponsor and presenter at the North Sea Flow Workshop. CMR has been working on research and development projects in the area of advanced solutions for liquid and gas measurement within the oil and gas industry, including multiphase flow measurement, for more than 30 years. This work has enabled industrial product development and established new business ventures within the oil and gas industry.

CMR Instrumentation collaborates with clients and partners on

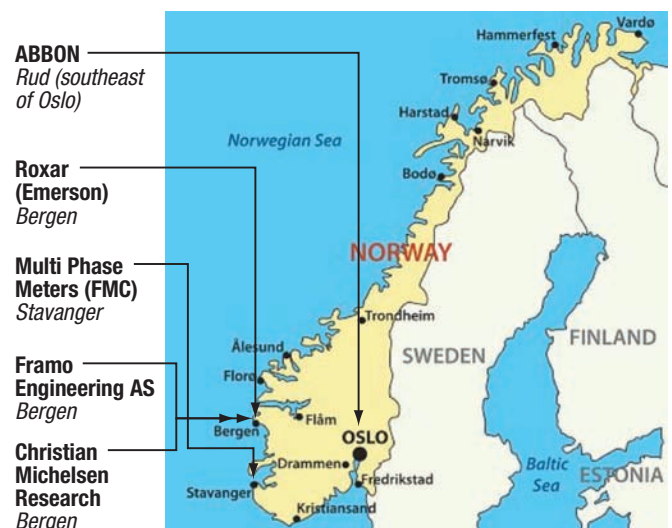
projects ranging from idea generation and research to industrial measurement solutions and products. The organization has had a multiphase flow facility since the early 1990s. Its new multiphase test flow loop became operational in January 2009.

TÜV SÜD NEL Ltd (tuvnel.com) is also a primary player in the North Sea Flow Workshop. Established in 1947 under the auspices of the UK Department for Trade and Industry (DTI), the organization quickly gained a reputation as a worldwide center of excellence for engineering and mechanical research. In 1995, the firm became part of the TÜV SÜD Group. This alignment gave NEL the backing of a strong and globally diverse parent while expanding its available client base.

NEL has been involved in flow system testing for over half a century and still maintains and develops the UK's National Flow Measurement Standards. Beyond these government standards activities, NEL today is considered a worldwide provider of technical consultancy, research, testing, and program management services. NEL owns and manages some of the most modern and sophisticated test, analysis, and experimental facilities in the world.

CMR and NEL's involvement as supporters and participants in the North Sea Flow Workshop is directly related to the oil and gas business in the North Sea. Both are "think tanks" that actively conduct research projects with suppliers and attempt to find technical solutions to important industry problems. For example, much of the research surrounding multiphase meters conducted by CMR was in response to the declining output of the North Sea oil fields and the need to find a way to both measure what is coming out of the pipe and determine the composition of the field below.

Norway has become a center of product and development for multiphase and ultrasonic flowmeters because of the presence of CMR in Norway and NEL in Scotland. The Christian Michelsen



Norway is home to a number of multiphase-related flowmeter companies. Multiphase is particularly relevant for North Sea oil & gas exploration efforts where outputs are declining and there is a need to not only measure what is coming out of the pipe, but also the composition of the subsea field.

Graphic courtesy of Flow Research, Inc.



Institute did the research from 1982 to 1985 to create a novel flare gas meter and, in 1985, founded a company around this meter called Fluenta (*fluenta.com*). Today a number of multiphase companies call Norway home, including Emerson Roxar (*roxar.com*, Stavanger), MultiPhase Meter (MPM, *mpm-no.com*, Stavanger), Framo Engineering (*framoeng.no*, Bergen), and Abbon (*abbon.com*, Rud). Christian Michelsen Research itself is located in Bergen.

CEESI's Twin Workshops

It should not be too surprising that the North Sea Flow Workshop is devoted to multiphase, ultrasonic and Coriolis flowmeters. The ultrasonic and Coriolis flowmeter markets are the two fastest growing flowmeter markets, and many of the major flowmeter suppliers are investing millions of dollars into research & development of these meters. Multiphase meters are an emerging technology, but they are vitally important to the oil & gas industry. With the search for energy supplies going full tilt worldwide, multiphase flowmeters promise to play a critical role in oil & gas exploration and production.

The Ultrasonic Meter Workshop

In 1999, Colorado Engineering Experiment Station Inc. (CEESI, *ceesi.com*) recognized the growing importance of ultrasonic flowmeters and launched the CEESI Ultrasonic Meter (USM) Workshop.

"We thought it was an opportunity to get all the available experts into one room to discuss this new technology," says Steve Caldwell, CEESI's CEO and president. "We knew if we held such a conference that it would be beneficial to the USM user community; we knew that if we started such a conference, that it would grow right along with the growth of the USM technology itself."

Caldwell's vision has proved prophetic. The 2000 USM Workshop in Clear Lake, Iowa, had 37 attendees, and by 2011 attendance at the Workshop, now held in Colorado Springs, Colo., rose to 180. The conference has grown in company participation too. In 2000, 12 companies participated, and in 2011, 61 companies were represented. The next USM Workshop will be June 18-19 in Colorado Springs.

The International Symposium on Fluid Flow Measurement (ISFFM) Workshop

In addition to the USM Workshop, CEESI also sponsors the ISFFM Workshop. ISFFM is more broadly based than the USM and focuses on technical issues that cut across various flow technologies. Examples of topics discussed include measurement uncertainty, fluid properties and gas analysis, critical flow, and primary standards. The 8th ISFFM is scheduled for June 20-22, 2012, in Colorado Springs. It follows the conclusion of the USM by several days. More than 50 presentations are anticipated, with two parallel tracks.

How CEESI Developed


CEESI was founded in 1951 as the Engineering Experiment Station — a program of the College of Engineering at the University of Colorado at Boulder for research, development, and testing of small rockets for the Naval Ordnance Test Station at China Lake, Calif. Over the next 30 years, the facility separated from the University of Colorado and moved to its present location — a surplus Atlas E nuclear missile site near Nunn, Colo. Projects during this time included developing new primary flow standards and developing test systems.

In 1986, Steve Caldwell and Wald Seidl purchased the facility and turned it into a for-profit operation. At this point, much of the focus of CEESI turned toward flowmeter calibration, with an emphasis on the natural gas industry. In 1999, CEESI opened the Iowa Natural Gas Calibration Facility in Garner, Iowa. Since that time, CEESI has become the premier flowmeter calibration facility in the United States.

Working Together to Move Flow Forward

It is interesting to compare CEESI and its role in flow measurement to CMR and NEL. In many ways, these organizations are similar in their orientation, though there are differences as well. CEESI is primarily a flow calibration facility, while NEL has both flowmeter test and calibration

facilities and is more broadly involved in research & development and technical consultancy. Meanwhile, CMR's multiphase test loop makes it unique. All three organizations work actively with suppliers and industry end-users to solve critical flow problems and to develop new products. All three organizations are active in sponsoring flowmeter conferences that provide an opportunity for movers and shakers in the industry to present the results of their research. Likewise, all of the conferences described here provide important opportunities for networking and for discussion of important flow topics.

There are many conferences to choose from, but not very many devoted to flow measurement. The conferences described here are what I believe to be the premier events in the world of flow measurement. 

Jesse Yoder, Ph.D., is president of Flow Research Inc. in Wakefield, Mass., a company he founded in 1998. He has 24 years of experience as an analyst and writer in process control. Dr. Yoder specializes in flowmeters and other field devices, including pressure and temperature products. He has written over 170 journal articles on instrumentation topics. Dr. Yoder can be reached at jesse@flowresearch.com.

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