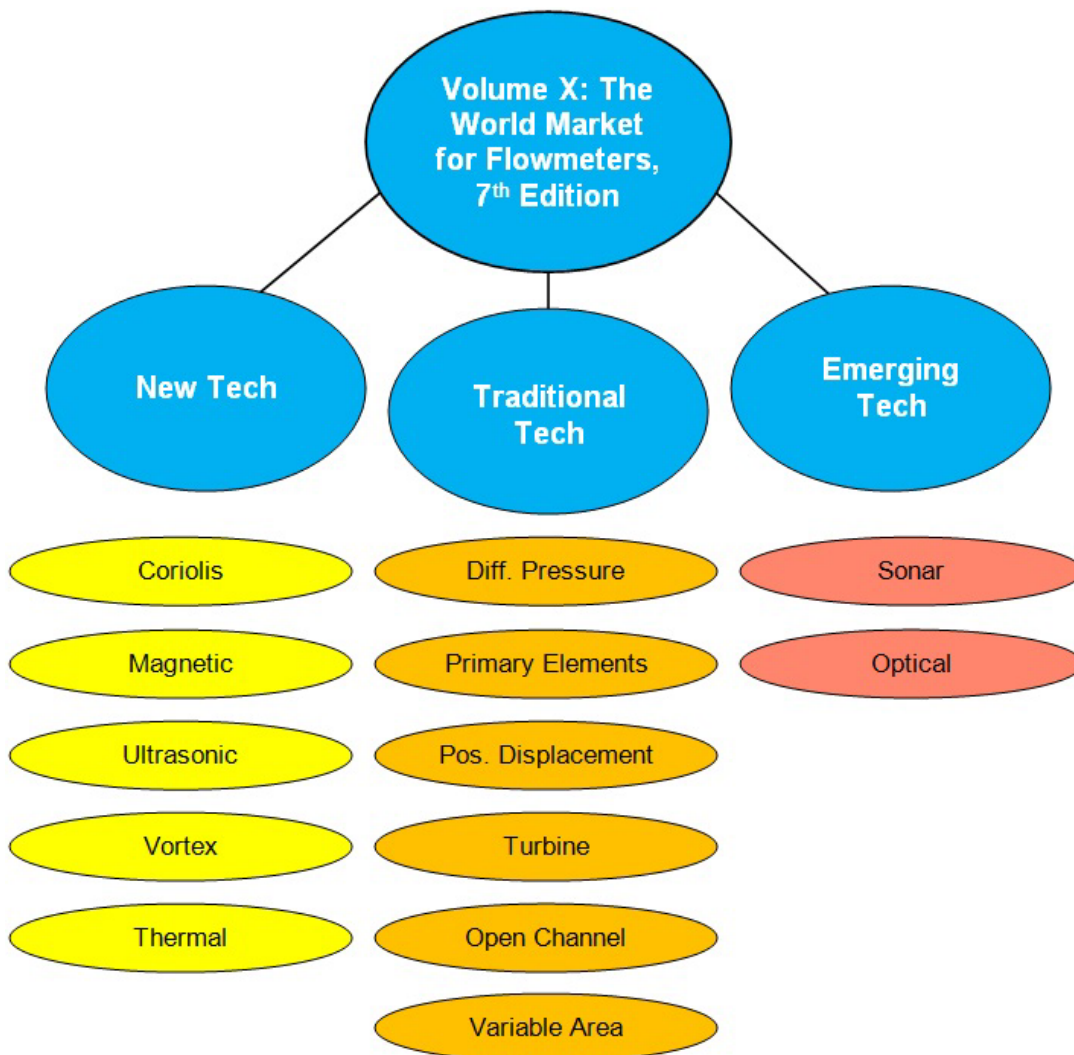




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Volume X: The World Market for Flowmeters, 7th Edition

Overview



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www.flowvolumex.com



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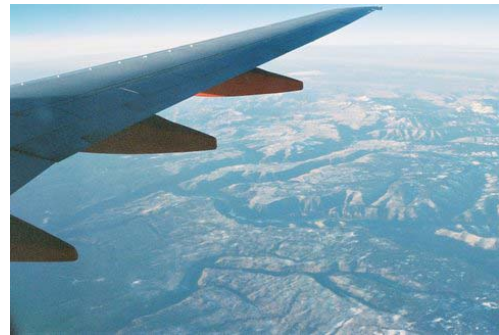
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Another 'instant classic' from Flow Research

Volume X: The World Market for Flowmeters, 7th Edition

Now you can profit from comprehensive market research on the worldwide flowmeter market – all in one place. *The World Market for Flowmeters, 7th Edition*, will be available in Q3 2018. It presents a complete picture of the worldwide flowmeter market. This study includes both new-technology and traditional technology flowmeters, as well as the emerging flow technologies of sonar and optical.



The view from 20,000 feet

This full-color, over-500-page study includes:

- **Market size** of the worldwide market for 11 flowmeter technologies
- Market size **forecasts** for each flowmeter type through 2022
- **Market shares** for each flowmeter type in 2017
- Both **worldwide** and **regional** market size and market share data
- A **technology description and analysis** for each flowmeter type, including major competitive strengths and weaknesses
- A **product line analysis** for the major manufacturers of each technology type
- **Company profiles** with product information for easy comparison

Why we are publishing this study

We completed our first *Volume X* study in 2003, and published subsequent editions in 2008, 2010, January 2013, August 2014 and January 2017. We have closely followed the growth in the markets of all the flowmeter types during this time. The main goal of this study is to determine the size of the worldwide flowmeter market, including all technologies, and to see if the trend towards new-technology flowmeters continues. This study contains revenue, unit, and average selling price data for all flow technologies, segmented by region. It provides the tools you need to compare market size, market shares, and growth rates for all the flow technologies. It also provides product analysis and growth factors for each flowmeter type. *Volume X* enables you to assess your competitive position in the flowmeters you supply and the ones you compete against. Market forecasts through 2022 are included.

Segmentation covers what our clients want

When we published our first *Volume X* study, we found that the worldwide flowmeter market equaled US\$3.1 billion in 2002. Today, it exceeds \$7 billion. In order to make this market more understandable, we divide it into three flowmeter groups: New-Technology, Traditional Technology, and Emerging Technology. From there, we look at each of the flowmeter technologies individually. Then we build up the total market from the individual flowmeter types. This technique gives you a comprehensive view of the parts and the whole.



Taking a closer look

This study provides the following worldwide **geographic breakouts** for each flowmeter technology:

- North America (United States and Canada)
- Western Europe
- Eastern Europe/FSU (Former Soviet Union)
- Mideast/Africa
- Japan
- China
- Asia/Pacific
- Latin America (Mexico, Caribbean, Central and South America)

The following **market segments** are common to each flowmeter technology chapter:

- Market size in dollars and units
- Manufacturer market shares
- Average selling prices by technology by region
- Technology analysis
- Product summaries by major manufacturer

Individual flowmeter technologies included in this study

New-Technology

Coriolis Flowmeters
Magnetic Flowmeters
Ultrasonic Flowmeters
Vortex Flowmeters
Thermal Flowmeters

Traditional Technology

Multivariable and Differential Pressure
Transmitters
Primary Elements
Positive Displacement Flowmeters
Turbine Flowmeters
Open Channel Flowmeters
Variable Area Flowmeters

Emerging Technology

Sonar and Optical

Overview chapters for each flowmeter group include valuable summary data

For example, the **New-Technology Flowmeters** overview chapter provides technology descriptions, compares new-technology flowmeters to the DP standard, describes the paradigm case method and its several criteria, and details new-technology flowmeter shipments on a worldwide and regional basis. Our paradigm case method of analysis determines the most suitable applications for each flowmeter type – and is backed up with our customer survey results, extensive supplier questionnaires, and other elements of our longterm involvement in the instrumentation field. The **Traditional Technology Flowmeters** and **Emerging Technology Flowmeters** overview chapters will be equally as detailed.

We also include **individual chapters for each of the flowmeter types** in the new-technology and traditional technology groups.

Flow Research has conducted individual studies of each flowmeter type over the years, with periodic updates. *The World Market for Flowmeters, 7th Edition* brings our research on these individual flowmeter markets together into a comprehensive overview, with data updated to 2017. Our method has always been to use a bottom-up approach when analyzing any market. In this way, we are able to both confirm data accumulated and trends we have been tracking as well as discover important new trends. Our success is based upon identifying what is new and comparing this information with our longterm knowledge of the market under study. We report our findings to you.

Focus on key issues affecting the market

As always, we will take a look at the key issues affecting flowmeter markets. Here are some examples:

Key issues addressed in the 7th Edition of this study

- The effect of large line size meters on the Coriolis flowmeter market
- Continued expansion of magnetic and vortex flowmeter opportunities and markets
- Growth in the ultrasonic market, especially in custody transfer applications
- Comparison of DP flowmeters and primary elements to other flowmeter markets
- Impact of new-technology flowmeters on the turbine and positive displacement markets
- Mergers and acquisitions in the worldwide flowmeter market
- Impact of the oil & gas industries on the flowmeter markets
- Effects of growth in China, India, and other developing countries on global markets
- Impact of new standards, such as the API standard for vortex in custody transfer
- A comparison of the new-technology and traditional technology flowmeter markets
- A list of suppliers for each flowmeter type along with the features carried by each supplier
- Growth rates for each flowmeter type in the rapidly expanding China and Asia-Pacific regions

Supplier information helps you compare manufacturer offerings

Detailed company profile information of all major suppliers into each of the individual flowmeter markets includes a product analysis – manufacturer by manufacturer – that will allow you to quickly compare the product lines of all major suppliers. There is no other report available today with this critical information combined into a single comprehensive view of the market.

The company profiles include important data such as contact information, revenues, product lines, company history, recent acquisition activity, and sales strategies. Each company's flowmeter product line is summarized in easy-to-read charts which include Series and Model names and designations.

Module A, the companion study to *Volume X*, includes sales strategies, descriptions of operating geographies, and the strengths and weaknesses of the firm's product offerings within the context of their market. *Module A* is described later in this overview.

Company Profiles

The following are some of the leading companies profiled in this study:

- ABB
- Armstrong: Veris
- azbil (Yamatake)
- Badger Meter: Cox Flow Measurement, Racine (RFI)
- Bopp & Reuther Messtechnik
- Brooks Instrument
- Cameron Measurement Systems: Caldon
- Danaher: Hach, McCrometer
- Emerson Process Management: Daniel, Micro Motion, Rosemount
- Endress+Hauser
- Faure Herman
- Fluid Components International (FCI)
- Fortive: Anderson Negele, Venture Measurement
- Fuji Electric
- GE Measurement & Control: Dresser
- Honeywell/Elster including Elster-Instromet, RMG
- IDEX: Accusonic, Liquid Controls Group (LCG)
- Itron
- KROHNE
- OVAL Corporation
- Roper Industries: Neptune Technology Group, FTI (Flow Technology Inc.)
- Schneider Electric/Foxboro
- Sensus
- SICK
- Siemens
- Sierra Instruments
- TechnipFMC
- Thermo Fisher Scientific
- Tokyo Keiki
- Tokyo Keiso
- Toshiba
- Yokogawa

Make great decisions with our data

As you know, having the best information available on a subject helps you make the best decisions. Flow Research has always been a source of reliable, accurate data that companies can trust. This study will quickly bring you up-to-speed on the global flowmeter market and its many components.

A few of the ways businesses tell us they use our studies to succeed:

- Compare growth rates and market sizes of different flow technologies
- Gain a worldwide perspective of competing suppliers in an industry, market, or technology
- Make an informed choice when considering a product purchase
- Use as a training or educational document
- Quickly survey and assess merger and/or acquisition opportunities
- Accurately forecast market demand for the many flowmeter technologies
- Understand the technical differences between new, traditional, and emerging technologies
- Have a reference standard of competitive technologies and models



Dr. Jesse Yoder

Table of Contents: The World Market for Flowmeters, 7th Edition

<i>Chapter One:</i> Executive Summary	<i>Chapter Thirteen:</i> Primary Elements
<i>Chapter Two:</i> Scope and Method	<i>Chapter Fourteen:</i> Positive Displacement Flowmeters
<i>Chapter Three:</i> Paradigm Case Analysis	<i>Chapter Fifteen:</i> Turbine Flowmeters
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<i>Chapter Ten:</i> Thermal Flowmeters	
<i>Chapter Eleven:</i> Traditional Technology Flowmeters	
<i>Chapter Twelve:</i> Multivariable and Differential Pressure Transmitters	

Why you must have this study

- Stay current with data on flowmeter shipments
- Understand how the 13 flow technologies stack up against each other
- Benefit from knowledge gleaned from 20+ years of data and 250+ studies
- Be among the first to own an ‘instant classic’ – at a price you can afford
- Capitalize on insights from our onsite visits to suppliers and end-users in the Middle East, Europe, the United States, and Australia
- Learn strategies to help you build your product line
- Assess your competitive positions with detailed company profiles

Plus over 150 informative color charts and tables like this one:

**Shipments of All Flowmeters Worldwide by Technology
(Millions of Dollars)**

Technology	2017	2018	2019	2020	2021	2022	CAGR
Coriolis	xxx.x	xxx.x	xxx.x	xxx.x	xxx.x	xxx.x	x.x%
Magnetic	xxx.x	xxx.x	xxx.x	x,xxx.x	x,xxx.x	x,xxx.x	x.x%
Ultrasonic	xxx.x	xxx.x	xxx.x	xxx.x	xxx.x	xxx.x	x.x%
Vortex	xxx.x	xxx.x	xxx.x	xxx.x	xxx.x	xxx.x	x.x%
Thermal	xx.x	xx.x	xx.x	xx.x	xx.x	xxx.x	x.x%
Diff. Pressure	xxx.x	xxx.x	xxx.x	xxx.x	xxx.x	xxx.x	x.x%
Primary Elements	xxx.x	xxx.x	xxx.x	xxx.x	xxx.x	xxx.x	x.x%
Pos. Displacement	xxx.x	xxx.x	xxx.x	xxx.x	xxx.x	xxx.x	x.x%
Turbine	xxx.x	xxx.x	xxx.x	xxx.x	xxx.x	xxx.x	x.x%
Open Channel	xxx.x	xxx.x	xxx.x	xxx.x	xxx.x	xxx.x	x.x%
Variable Area	xxx.x	xxx.x	xxx.x	xxx.x	xxx.x	xxx.x	x.x%
Total	x,xxx.x	x,xxx.x	x,xxx.x	x,xxx.x	x,xxx.x	x,xxx.x	x.x%

Volume X: The World Market for Flowmeters 7th Edition



Bergen, Norway – photo by Flow Research



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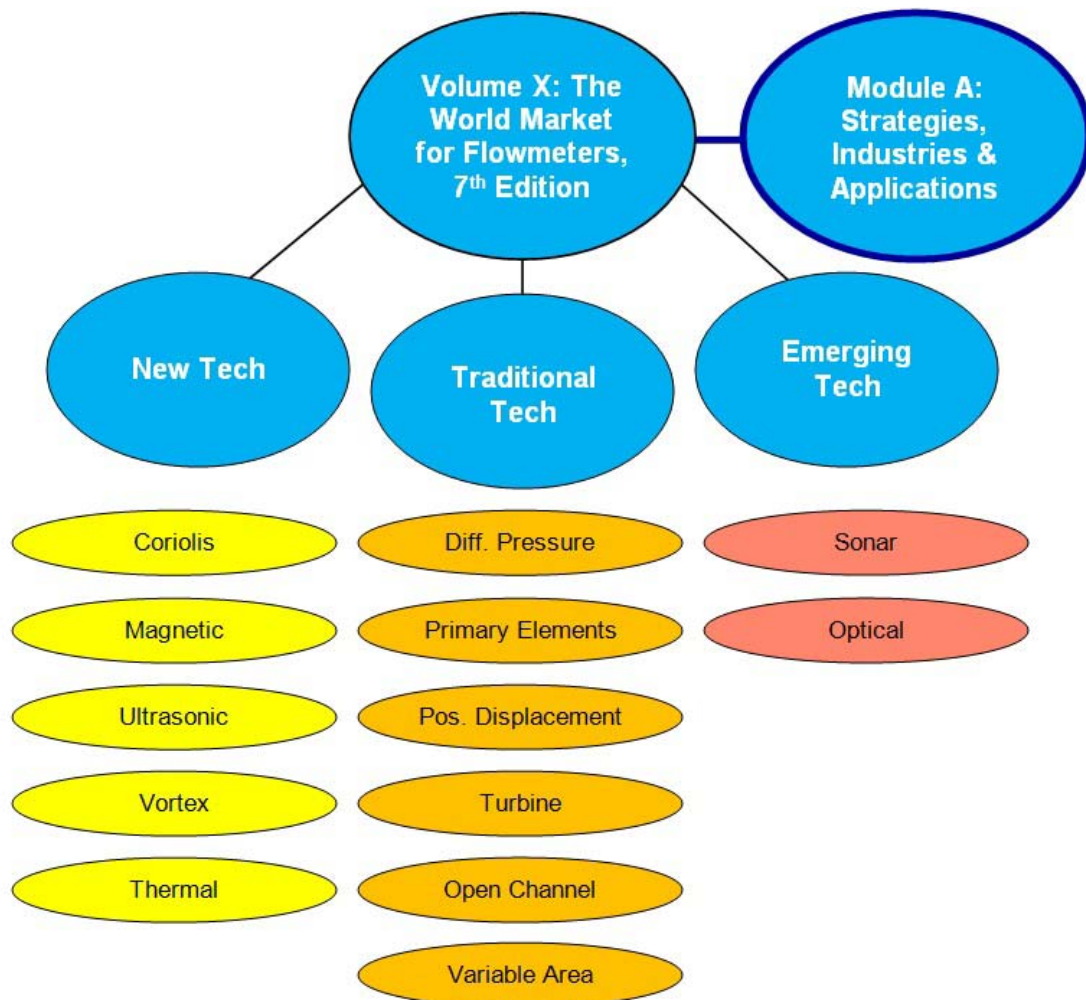
Why Flow Research?

- We specialize in flowmeter markets and technologies
- We have researched all flowmeter types
- We study suppliers, distributors, *and* end-users
- Our worldwide network of contacts provides a unique perspective
- Our mission is to supply the data to help your business succeed



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Volume X 7th Edition: Module A: Strategies, Industries, & Applications Overview



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www.flowvolumex.com



Module A: Strategies, Industries, & Applications, 7th Edition

The in-depth research in *Module A: Strategies, Industries, & Applications* complements and builds on the results of *Volume X: The World Market for Flowmeters, 7th Edition*. The module can be ordered as a standalone report or as an add-on to the main study.



This content-rich module provides strategies for companies already in the flowmeter market as well as for companies considering joining the market.

Company strategies apply to the entire flowmeter market, as well as to individual product lines.



Included in the module are tactical and strategic recommendations for suppliers in each market segment. A world view of the market forecasts the best areas for future growth.

Module A provides focused insights into industry trends, explaining product improvements, and advantages and disadvantages inherent to each flowmeter type. Also provided are shipments by application and industry in dollars and percentages

for the following new-technology and traditional technology flowmeters: **Coriolis, magnetic, ultrasonic, vortex, thermal, differential pressure, primary elements, positive displacement, and turbine flowmeters.**

For each technology, the module provides worldwide **shipments by industry and application** for the following geographic breakouts:

- North America (United States and Canada)
- Western Europe
- Eastern Europe/FSU (Former Soviet Union)
- Mideast/Africa
- Japan
- China
- Asia/Pacific
- Latin America (Mexico, Caribbean, Central and South America)



In *Module A* you will find:

- Shipments by industry and application in dollars and percentages, broken out by flowmeter type
- Forecasted growth rates by both application and industry through 2022
- Essential information on market outlook and industry trends by flowmeter type
- Realistic strategies for success for those entering or already in the flowmeter market.

Data includes **dollars and percentages of shipments by flowmeter type** in 2017 and forecasted through 2022 in the following **industries**:

- Oil and Gas
- Refining Industry
- Chemical Manufacturing
- Pharmaceutical Manufacturing
- Semiconductor Production
- Food and Beverage
- Pulp and Paper
- Metals and Mining
- Water and Wastewater
- Power and Energy



Applications are specific to flowmeter type, but include:

- Oil and Gas
- Custody Transfer
- Process Measurement
- Compressed Natural Gas
- Slurries
- Sanitary/Hygienic
- Water Flow
- Water-based Chemicals
- Other

Key topics addressed in Module A

- Tactical and strategic recommendations for suppliers in each market segment
- Discussion of market forces at work
- Best areas for future growth
- Strategic action perspectives
- Real world success stories

Applications by Flowmeter Type

New-Technology Flowmeter Applications

Coriolis

- Custody Transfer of Natural Gas (CTNG)
- Custody Transfer of Liquids
- Process Measurement
- Compressed Natural Gas (CNG)
- Other

Magnetic

- Water Flow
- Water-Based Chemicals
- Hydrofracking
- Slurries
- Sanitary/Hygienic
- Process Control
- Custody Transfer
- Dosing/Filling Machines
- Other

Ultrasonic

Inline – Gas

- Custody Transfer of Natural Gas (CTNG)
- Check Metering
- Process Measurement
- Flare/Stack Gas Measurement

Inline – Liquid

- Custody Transfer-Petroleum Liquids
- Custody Transfer-Non-Petroleum Liquids
- Check Metering
- Process Measurement
- District Heating

Clamp-on and Insertion by fluid type

- Petroleum Liquids
- Non-Petroleum Liquids
- Gas
- Steam

Vortex by fluid type

- Gas
- Petroleum Liquids
- Non-petroleum Liquids
- Saturated Steam
- Super-heated Steam

New-Technology Flowmeter Applications continued

Thermal

- Continuous Emissions Monitoring (CEM)
- Flare Gas/Flue Gas
- Landfill Gas Recovery
- Biogas Recovery
- Biomass Fermentation and Recovery
- Coal Mine Methane Recovery
- Boiler Inlet
- Wastewater Treatment
- Air/Compressed Air
- Sanitary/Hygienic
- Natural Gas Submetering
- Other

Traditional Technology Flowmeter Applications

Multivariable and Differential Pressure

Transmitters by fluid type

- Liquid
- Gas
- Steam
- Air

Primary Elements by fluid type

- Liquid
- Gas
- Steam
- Air

Positive Displacement by fluid type

- Water/Wastewater
- Gas
- Oil
- Industrial Liquids

Turbine by fluid type

- Water/Wastewater
- Gas
- Oil
- Industrial Liquids

Flow Research, Inc.

Volume X: The World Market for Flowmeters, 7th Edition and **Module A: Strategies, Industries, and Applications** are publications of Flow Research, Inc. of Wakefield, Massachusetts. Flow Research is the only market research company whose primary mission is to research flowmeter and instrumentation markets.

Flow Research specializes in instrumentation, and conducts **market research studies** in a wide variety of instrumentation areas that can be purchased by anyone interested in the topics. We create these studies through interviews with suppliers, distributors, and end-users. Topics include all of the flowmeter technologies as well as oil & gas flow measurement and custody transfer markets, flow calibration facilities, temperature sensors, temperature transmitters, pressure transmitters, liquid analytical instruments, some level measurement devices, and selected API-certified valves. For more details, go to www.flowstudies.com. Some recent and currently scheduled studies are listed on the next page.

The lead analyst for this study, **Dr. Jesse Yoder**, President of Flow Research, has over 29 years of experience writing about and analyzing process control and instrumentation markets, beginning as president and founder of Idea Network before founding Flow Research. Dr. Yoder has received two patents for new flowmeter designs. Several prototypes of these designs have been built and are currently being tested. He has written over 250 market research studies and published more than 280 articles on flow and instrumentation in industry journals. Many of the articles written by Dr. Yoder can be read by visiting the Flow Research article website at www.flowarticles.com. His latest book, *The Tao of Measurement: A Philosophical View of Flow and Sensors*, with Richard E. Morley as co-contributor, was published in 2015 by the International Society of Automation (ISA). Topics covered include temperature, pressure, flow, time, length, and area.

Belinda Burum, Vice President, worked in journalism and advertising before entering high tech 18 years ago as a writer, marketing communications manager, and customer references consultant. She joined Flow Research in 2002 and has worked on many projects.

Norm Weeks, Senior Market Analyst, joined Flow Research in 2004 after 24-years with Verizon specializing in innovative solutions for major enterprises, introducing new products and lifecycle management strategies, and product marketing. At Flow Research, he is a fulltime market analyst, contributing research, analysis and writing to our studies, White Papers, and Worldflow publications. He is also a specialist in custom projects.

Leslie Buchanan, Research Assistant, Publication Production Associate, joined Flow Research in 2010. She took on management of the contacts database, assistance with customer liaison, and developing standards for our publication formats. She has since become increasingly involved with research, writing, and production for studies, Worldflow and other publications.

Harry Lund, Sales Director, joined Flow Research in October 2016. He has 45 years experience in the flow measurement industry with several US and international corporations including technical writing, communication systems, application engineering, and product management as VP Sales, Service, and Marketing. At Flow Research, with the valuable resource

of his experience and skills with people, products and the flow measurement business world, he specializes in customer liaison and sales, and can consult on marketplace strategies.

David Goldstein, Business Analyst, joined Flow Research in September 2016. He has an MBA from Boston University and 30 years of professional experience including various management positions in Sales and Marketing with consumer product companies. He developed products and programs for customers as large as Walmart and as small as independent corner drug stores. At Flow Research, he combines his market research and business analyst skills with his acuity and organizational abilities to assist with research and writing for studies, and with the database.

Vicki Tuck serves the essential role of Administrative Assistant, does news research for the Worldflow publications, and also assists with outreach and the database. **Christina Glaser** redesigned and maintains our many websites.

Recent and Currently Scheduled Flow Research Studies

Websites

New-Technology Flowmeter Studies

The World Market for Coriolis Flowmeters, 5 th Edition	www.flowcoriolis.com
The World Market for Magnetic Flowmeters, 6 th Edition	www.flowmags.com
The World Market for Ultrasonic Flowmeters, 5 th Edition	www.flowultrasonic.com
The World Market for Vortex Flowmeters, 6 th Edition	www.flowvortex.com
The World Market for Thermal Flowmeters, 2 nd Edition	www.flowthermal.com
The World Market for Multiphase Flowmeters, 2 nd Edition	www.flowmultiphase.com
Multiphase: Module A: The World Market for Watercut Meters	www.flowmultiphase.com

Traditional Technology Flowmeter Studies

The World Market for Primary Elements, 2 nd Edition	www.flowplate.com
The World Market for Pressure Transmitters, 5 th Edition	www.worldpressure.com
The World Market for Positive Displacement Flowmeters, 2 nd Edition	www.flowpd.com
The World Market for Turbine Flowmeters, 2 nd Edition	www.flowturbine.com

Mass Flow Controllers

The World Market for Mass Flow Controllers, 4 th Edition	www.flowmfc.com
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Cross-Technology Flowmeter Studies

Volume X: The World Market for Flowmeters, 7 th Edition	www.flowvolumex.com
Volume X: Module A: Strategies, Industries, and Applications	www.flowvolumex.com
Core Study: The World Market for Gas Flow Measurement, 3 rd Edition	www.gasflows.com
Module C: The World Market for Custody Transfer of Natural Gas	www.custodytransfer.com

Flow Calibration

Core Study: Worldwide Gas Flow Calibration Facilities and Markets	www.flowcalibration.org
Module A: Worldwide Liquid Flow Calibration Facilities and Markets	www.flowcalibration.org

Temperature

The World Market for Temperature Sensors	www.tempresearch.com
The Market for Temperature Sensors in the Americas, 3 rd Edition	www.tempresearch.com

Level

The World market for Level Measurement Devices	www.levelresearch.com
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What are New-Technology Flowmeters?

New-Technology flowmeters include Coriolis, magnetic, ultrasonic, vortex, thermal, and multiphase. They share four features:

1. They have been introduced since 1950.
2. They incorporate technological advances that avoid some of the problems inherent in earlier flowmeters.
3. They are the focus of more of the product development efforts undertaken by the major manufacturers.
4. Their measured performance, especially accuracy, is superior to that of Traditional Technology meters on a standard basis.

Traditional Technology flowmeters include differential pressure, (primary elements used with DP), positive displacement, turbine, open channel, and variable area.

Emerging Technology flowmeters include sonar and optical.

The Flow Research *Founding Sponsor* Program



Blaise Pascal
mathematician, inventor,
philosopher, writer

Flow Research instituted the Founding Sponsor Program to produce studies that most closely match our clients' needs. This program enables companies who wish to participate at a high level in a study's research to influence its scope and segmentation. In addition, Founding Sponsors receive regular updates from Flow Research on study progress, and receive a significant discount on the regular price of the study. Being a Founding Sponsor requires making an early commitment to purchase the study. However, in return, Founding Sponsors receive a significant discount off the regular price of the study. Payment can be made either in one amount at the beginning of the study, or split into two, with the second payment due upon delivery of the study.

Procedure: Early in the planning phase of a study, Founding Sponsors receive a proposal that includes the proposed segmentation. Founding Sponsors can propose additional segmentation, and can also suggest changes to the proposed segmentation. While the decision to adopt particular segmentation ultimately lies with Flow Research, and is based on input from all contributors, we will do our best to accommodate the specific needs of each of our clients. During the research phase of a study, Flow Research will issue regular reports that provide updates on the progress of the research. These reports will be sent to Founding Sponsors, who are then invited to provide any additional input or comments into the study.

For additional details, or to find out how the Founding Sponsor program applies to any particular study, please contact Flow Research. We look forward to working with you! If you have any questions about the Founding Sponsor program, please contact Norm Weeks at (781) 245-3200, or norm@flowresearch.com.

Volume X 7th Edition: Module A: Strategies, Industries, & Applications Overview



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Why Flow Research?

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- We study suppliers, distributors, *and* end-users
- Our worldwide network of contacts provides a unique perspective
- Our mission is to supply the data to help your business succeed