# Human Machine Interface Software Worldwide Outlook

MARKET ANALYSIS AND FORECAST THROUGH 2012

> **Project Team:** Craig Resnick



## Copyright © 2008 ARC Advisory Group

All data contained in this report are proprietary to and copyrighted by ARC Advisory Group and no part of it may be reproduced or published, orally or in written form, or distributed in either original or reproduced form to anyone outside the client's internal organization within five (5) years of the report date without prior written permission of ARC Advisory Group.

#### **Market Forecast Updates**

ARC has provided five year forecasts in order to show long-term trends in this marketplace. Today, however, the outlook for any market can dramatically change due to rapidly changing technology and global economic conditions. ARC typically updates our long-term forecasts periodically as required. Therefore, we recommend that clients obtain the latest market information from ARC before making any important decisions. ARC does not recommend clients to use the market forecast data beyond two years for future business planning.

#### Disclaimer

While every effort has been made to ensure the accuracy and the completeness of the information presented in this report, ARC Advisory Group accepts no liability what so ever for consequences of any actions taken upon the findings of the report.

#### **Report Follow up Services**

An ARC industry report, while comprehensive, cannot possibly answer every question or provide all information desired by each and every client. In order to ensure that our clients have access to ARC's data base and consulting staff, we provide follow up services at cost. The goal of this program is to provide clients with additional data and analysis which are of specific interest. We hope that through the use of these services our clients will have the best possible information for making decisions and developing strategies. Naturally, questions that are procedural, or involve clarification of methodology or definitions, are welcome at no charge to subscribers.

Telephone us at 781-471-1000 or email at info@ARCweb.com and tell us the information you desire. We will discuss your needs, call you back, tell you how much it will cost, and how long it will take. Our fees for follow-up services will be at our cost for labor, plus expenses incurred. It is recommended that clients seek a quote in advance.

# **Table of Contents**

Li	st of Figures	A
AI	RC Services	a
1.	Executive Overview	1-1
	Scope	1-2
	Market Size and Forecast	1-3
	Market Shares	1-3
	Market Forecast	1-4
	Strategies and Recommendations for Success	
	Design HMI Software Optimized for Use in PACs	1-5
	Create User Friendly Migration Tools	1-5
	Develop a Business Case of the Benefits of 64-Bit Computing and Microsoft Vista	or
	Server 2008	1-6
	Promote HMI Software as the Focal Point to Deploy CPS	1-7
	Provide Digital Dashboard Tools Focused On Sustainability and Energy Savings	
	Applications	1-8
2.	Scope	2-1
	Key Issues Researched	2-1
	Market Size and Forecast Definitions	2-2
	Key Currency Factors	2-3
	Key Regional Segments	2-4
	HMI Software Functionality	2-5
	End User Industries and Key Industry Segments	2-6
	HMI Software by Operating System	2-6
	HMI Software by Customer Type	2-8
	HMI Software by Sales Channel	2-9
3.	Market Shares	3-1
	Total HMI and Related Control Software Business	3-3
	Siemens	3-3
	Wonderware	3-4
	Rockwell Automation	3-5
	GE Fanuc	
	Schneider Citect	
	Market Shares by Region	3-8
	Europe, Middle East, & Africa	
	Emerging Europe (Eastern and Central Europe)	3-9
	Middle East	3-9
	North America	3-10
	Asia	3-11
	India	3-11
	Japan	3-12
	Latin America	3-13

	A Note Regarding Currency Fluctuations	
	Effect on EMEA growth	
	Effect on worldwide growth	
	Comparing market size and market shares from different years	
4.	Market Analysis and Forecast	4-1
	Segmentation and Forecasts	
	Total HMI and Related Software Business Including Services	
	Factors Contributing to Growth	
	Greater Use of PACs with HMI Software in Process Applications	
	Sustainable Manufacturing	
	Increased Operational Visualization Information Agility	
	Leveraging Dynamic OEE	
	Maximizing Visualization Capabilities by Leveraging Technology	
	Factors Inhibiting Growth	
	HMI Software Units Growing Faster Than Revenue	
	Economic Slowdown Due To Inflation and Escalating Energy Costs	
	Pirated Software Dilutes HMI Software Revenue Potential	
	Insufficient Tools and Support for Operating System Migration	
	Exchange Rates Negatively Affecting Growth	
	A Note Regarding Currency Fluctuations	
	Effect on EMEA growth	
	Effect on worldwide growth	
	Comparing market size and market shares from different years	
5.	Supplier Profiles	5-1
	Adroit Technologies	5-2
	Afcon Industries Group	5-4
	ARC Informatique	5-5
	Citect/Schneider Electric	5-7
	СОРА-ДАТА	5-10
	ELUTIONS - Wizcon Systems	5-13
	GE Fanuc Intelligent Solutions	5-15
	ICONICS	5-19
	InduSoft	5-25
	National Instruments	5-27
	Parker Hannifin	5-29
	Rockwell Automation	5-31
	Siemens	5-34
	Vista Control Systems	5-39
	WEBtactory	5-41
	Wonderware, Business Unit of Invensys	5-42
	7-Technologies	5-47

## Appendix A: Methodology

Appendix B: Common Industry Terminology and Abbreviations

# **List of Figures**

#### Scope

- 2-1 Standard Industry Code Classifications Process Industries
- 2-2 Standard Industry Code Classifications Discrete Industries
- 2-3 Standard Industry Code Classifications Service Industries
- 2-4 HMI Software Questionnaire
- 2-5 HMI Software Questionnaire
- 2-6 HMI Software Questionnaire

#### **Market Shares**

- 3-1 Leading Suppliers of Human Machine Interface Software
- 3-2 Leading Suppliers of Human Machine Interface Software for North America
- 3-3 Leading Suppliers of Human Machine Interface Software for EMEA
- 3-4 Leading Suppliers of Human Machine Interface Software for Asia
- 3-5 Leading Suppliers of Human Machine Interface Software for Latin America

#### **Market Forecast**

- 4-1 Total Shipments of Human Machine Interface Software
- 4-2 Total Shipments of Human Machine Interface Software for Service Revenues
- 4-3 Total Shipments of Human Machine Interface Software for Software Revenues
- 4-4 Total Shipments of Human Machine Interface Software by Revenue Category
- 4-5 Total Shipments of Human Machine Interface Software for Software Revenues by Type
- 4-6 Total Shipments of Human Machine Interface Software for Software Revenues by Operating System
- 4-7 Total Shipments of Human Machine Interface Software by Revenue Category
- 4-8 Total Shipments of Human Machine Interface Software for Software Revenues by Type
- 4-9 Total Shipments of Human Machine Interface Software for Software Revenues by Operating System
- 4-10 Total Shipments of Human Machine Interface Software by Revenue Category
- 4-11 Total Shipments of Human Machine Interface Software for North America
- 4-12 Total Shipments of Human Machine Interface Software for EMEA
- 4-13 Total Shipments of Human Machine Interface Software for Asia
- 4-14 Total Shipments of Human Machine Interface Software for Latin America
- 4-15 Total Shipments of Human Machine Interface Software by World Region
- 4-16 Total Shipments of Human Machine Interface Software for Asia by Country
- 4-17 Total Shipments of Human Machine Interface Software by World Region
- 4-18 Total Shipments of Human Machine Interface Software for Asia by Country
- 4-19 Total Shipments of Human Machine Interface Software by World Region
- 4-20 Total Shipments of Human Machine Interface Software for Asia by Country
- 4-21 Total Shipments of Human Machine Interface Software by Industry
- 4-22 Total Shipments of Human Machine Interface Software by Industry
- 4-23 Total Shipments of Human Machine Interface Software by Industry

- 4-24 Total Shipments of Human Machine Interface Software by Sales Channel
- 4-25 Total Shipments of Human Machine Interface Software by Sales Channel
- 4-26 Total Shipments of Human Machine Interface Software by Sales Channel
- 4-27 Total Shipments of Human Machine Interface Software by Customer Type
- 4-28 Total Shipments of Human Machine Interface Software by Customer Type
- 4-29 Total Shipments of Human Machine Interface Software by Customer Type
- 4-30 Total Shipments of Human Machine Interface Software by Operating System
- 4-31 Total Shipments of Human Machine Interface Software by Operating System
- 4-32 Total Shipments of Human Machine Interface Software by Operating System



THOUGHT LEADERS FOR MANUFACTURING & SUPPLY CHAIN

## **ARC Consultant Biography**

Craig Resnick Research Director ARC Advisory Group 781-471-1157 cresnick@arcweb.com



#### **Research Areas of Expertise**

Craig's focus areas include Production Management, HMI, I/O, Industrial PCs, OITs, PLCs, OEE, PACs, PC-based Control, and Embedded Systems; Packaging, Plastics and Rubber Industries.

#### **Responsibilities and Experience**

Craig Resnick is part of the Automation consulting team at ARC covering the PLC, PAC, HMI, OIT and Industrial PC markets as well as the Packaging, Plastics and Rubber Industries. He is the primary analyst for some of ARC's Automation Supplier and Financial Service clients.

Craig has 26 years of experience in the areas of sales, marketing, product development, and project management in the industrial market. This experience was gained with major suppliers of PLCs, process control systems, power transmission equipment, and field devices.

Craig has been with ARC for eight years. Prior to ARC, Craig spent four years as Director of Sales & Marketing for Dynisco Instruments. His responsibilities included strategic planning, sales, product management and new market development for pressure & temperature transmitters and display & control instrumentation. Prior to that, Craig spent six years as the Director of Marketing for Boston Gear-Altra Motion. His responsibilities included strategic planning and product management for speed reducers, PLCs, photoelectric/proximity sensors, motors, and AC & DC drives. Previously, Craig spent three years as PLC Product Manager for Siemens, releasing SIMATIC S5 into the U.S. market and developing distribution & vertical channels. Craig began his career at the Foxboro Company, where he spent three years as a Field Project Manager responsible for design, installation, start-up and debugging of systems primarily for Textile and Paper manufacturers, along with two years in Foxboro's Oil and Gas Industry Marketing group.

#### Education

Craig is a graduate of Northeastern University in Boston with both an MBA degree as well as a BS degree in Electrical Engineering.

#### **ARC Research Reports and Publications**

- Applying DOM to Increase Injection Molding Profitability
- Best Practices in Cyber Security for Manufacturing Plants
- OPC Enhanced Certification Program: The Next Evolution
- Choosing the Best Thin Client Approach for HMI Software
- PACs Provide Single Platform Interoperability
- Establishing Requirements for HMI Systems Evaluation
- Globalization Is Expanding the Role of the PLC
- Packaging Machinery Strategies for End Users and Machine Builders
- Critical Benefits of Change Management Software Explored
- Human Machine Interface Software Worldwide Outlook Study
- Dynamic Overall Equipment Effectiveness (OEE) Strategy Report
- Industrial Controls Evolve to Programmable Automation Controllers (PACs)
- New Market Drivers for Controller Selection
- Scalable Vector Graphics, The Future Look of HMI
- How to Choose the Best Thin-Client HMI Technique
- OPC XML-DA and DX Gaining Traction across the Manufacturing Enterprise
- OPC UA Provides Enterprise-wide Connectivity
- Increasing Manufacturing Capacity While Minimizing Capital Expenditures
- Keys to Fast & Flexible Factory Automation
- Tools That Help Plants Evolve from Cellular Manufacturing
- Machine Migration Strategies Enable Improved RONA and TCO
- Energy Management & Optimization Systems Provide Documented Savings & ROI
- Industrial Energy Management Powers Manufacturing Efficiencies
- Managing Your Distributors: Some Strategies for Success

#### **Other Published Work**

See <u>www.google.com</u> search "Craig Resnick" ARC

#### About ARC Advisory Group

Founded in 1986, ARC Advisory Group has grown to become the Thought Leader in Manufacturing and Supply Chain solutions. For even your most complex business issues, our analysts have the expert industry knowledge and firsthand experience to help you find the best answer. We focus on simple, yet critical goals: improving your return on assets, operational performance, total cost of ownership, project time-to-benefit, and shareholder value.

## **ARC Services**

Thank you for purchasing ARC Advisory Group's Global Outlook Study. The material was planned and prepared to help save you time and money with your research. ARC is well known for providing the highest quality and most accurate market intelligence products and services. Since 1986, ARC Advisory Group has provided products & services to hundreds of clients, ranging from start-up firms to Fortune 100 companies.

Our analysts follow technology and industry events on a daily basis. They have a broad range of expertise in such areas as e-business, enterprise applications, integration strategies, and industrial automation, including; control systems, drives, sensors, actuators, networks, computers, software, and services.

ARC maintains one of the most in-depth databases in the world on technologies, standards, and the products and capabilities of hundreds of automation and software companies. This database is based on thousands of interviews, user surveys, and company visits. Our global network of industry contacts is an invaluable asset in discerning long-term trends from fads.

Our list of available products and services continue to expand as ARC continues to invest in new technologies and resources to meet the demands of our customers. For more details about ARC Advisory Group and how we can further assist you, please contact one of our regional offices nearest you or visit our website: www.arcweb.com.

#### **Continuous Advisory Services**

ARC's Advisory Services deliver a comprehensive portfolio of knowledgebased products and services that keep you ahead of the latest developments in enterprise applications, IT, and plant systems. Our analysts sift through the clamor of the market hype delivering clear, concise, supplier-neutral summaries of key events and technologies. A low client to analyst ratio ensures quick direct access to those who can provide the intelligence you need.

#### **Market Intelligence Services**

The rapid pace of business today creates a constant demand for fresh market intelligence. ARC is the premier provider of worldwide market analysis, forecasts, and strategic reports for a wide range of e-business, enterprise application, and automation solutions. ARC's market outlook studies are known for the most comprehensive assessment of the marketplace, including market shares of the leading suppliers and a five year forecast for key market segments.

#### **Investor Information Services**

Each year ARC analysts write unbiased reviews of hundreds of software and solution providers around the world. This market intelligence, coupled with private discussions with our experienced analysts, provides invaluable insight to our financial clients.

#### **Merger & Acquisition Services**

Our independent, objective, and knowledgeable analysts can assist in the evaluation of your M&A initiatives, providing market intelligence that is often unavailable to your in-house staff. Our partnership with several investment firms completes our offering, providing you with a full range of due diligence and partner search services.

#### **Partner Search Services**

Finding the right partner in a new application area or in a country or region you are not familiar with can be a very time consuming and challenging task. With an extensive network of industry contacts, we can assist you in identifying dependable strategic partners.

#### **Strategy Forums**

Each year ARC hosts a number of forums and conferences in major cities around the world. These forums provide an excellent opportunity for corporate executives to network with their peers and gather industry intelligence to fine tune their strategic vision for the future.

#### **Consulting Services**

At times, you may have an immediate need for personal intelligence. Our consulting services provide you with the opportunity of applying ARC's demonstrated experience in the collection and synthesis of information into knowledge to meet your specific needs.

# **Chapter 1 Executive Overview**

The worldwide Human Machine Interface (HMI) software market experienced strong growth over the last two years, growing at 19.3 percent compound annual growth (CAGR). There has been a significant amount of growth as a result of two primary factors. First, HMI software suppliers continued to add services at an accelerated rate, driven by the end users' and OEMs' need for technical support, because they no longer have the personnel internally to provide the services. Second, Supervisory HMI software, which is used to support HMI software functionality, such as configuration, runtime, connectivity, control, and alarm management, had the

HMI Software Market				
Total 2007 Shipments (Millions of Dollars)	\$926.1			
CAGR (2007-2012)	9.1%			

fastest growth of any HMI software type. Growth in this segment indicates how HMI software suppliers are expanding their application space and represent the direction that the HMI software market is heading for the future.

The HMI software market is in a period of relatively strong

growth with an expected CAGR of 9.1 percent over the next five years. The services' market growth is expected to be stronger than the total market growth with a CAGR of 13.5 percent over five years.

As expected, Windows XP was the fastest growing operating system in

The services' market growth is expected to be stronger than the total market growth with a CAGR of 13.5 percent over five years. The market for service and support will increase as a result of the end users' and OEMs' growing needs for technical support as they no longer have the internal personnel to provide it. terms of revenue. However, Windows CE was the fastest growing operating system in terms of units. This growth was due to Windows CE replacing proprietary software embedded in devices, such as operator interface terminals and the increased deployment of HMI on wireless devices, such as PDAs, tablet PCs, and mobile phones.

HMI software suppliers had their best regional development in Asia; however, North America and Europe, Middle East, & Africa (EMEA) also experienced strong growth. The common denominator was growth of HMI software solutions tied to Programmable Automation Controllers (PACs) in the process and hybrid industries, led by Oil & Gas. The Food & Beverage industry maintains its leading industry position. Addressing the worldwide market for HMI software, this report is intended to serve as an effective planning guide for companies providing HMI software, and companies contemplating entry into this market. Users of HMI Software will also find the report essential to their vendor selection process. Common denominators amongst the leading HMI software suppliers were a strong global presence in China and Eastern Europe, the ability to provide scalable open systems, and having key presence in industries, such as Automotive, Food & Beverage, Mining & Metals, Electric Power, Water & Wastewater, and Oil & Gas. These HMI software suppliers could optionally provide the hardware that their systems are installed on, as well as software mod-

ules that provide production management or MES capability, such as historians, OEE, tracking & tracing, etc. These HMI software suppliers provided excellent service through 24/7 support and through a comprehensive network of global solution providers and channels. These HMI software suppliers are strong advocates of OPC-UA, and also leverage already established global brands that have an advantage, because they are already well known in the markets they are trying to enter.

#### Scope

Addressing the worldwide market for HMI software, this report is intended to serve as an effective planning guide for companies providing HMI software, and companies contemplating entry into this market. Users of HMI Software will also find the report essential to their vendor selection process. The report is specifically prepared to provide strategic information to industry executives responsible for planning, marketing, sales, and development of their company's HMI and related software business.

This in-depth analysis of the HMI and related software marketplace includes market size and segmentation, market forecast, industry structure, and supplier market shares and profiles. In addition to the quantitative assessment of the marketplace, this report explores in-depth the key issues which will impact this marketplace in the future.

Data contained in this study also reflect revenues from embedded HMI software used in HMI hardware devices, such as operator interface terminals as well as wireless HMI hardware devices, such as PDAs, tablet PCs, and mobile phones. In addition, data contained in this study reflects revenues from HMI and related software used as part of a Collaborative Production Management (CPM) software suite. Software module revenue used to directly support the HMI Software, such as configuration, runtime, connectivity, control, alarm management, etc. is included.

#### **Market Size and Forecast**

#### **Market Shares**

Siemens is the global market share leader in HMI software revenue by a close margin, propelled by acquisitions as well as the benefits of a strong currency. Siemens maintains their strong HMI software revenue market share leadership position in the EMEA region. Wonderware maintains the revenue market share leadership position in the Latin America region.



Rockwell Automation maintains the revenue market share leadership position in the North America region, and GE Fanuc maintains a solid number three position in North America, EMEA, Asia, and the Latin America regions. Schneider Citect maintains the revenue market share leadership position in the Asia region.



The EMEA region is the largest HMI software market in the world. In Western Europe, growth does appear to be decelerating and will certainly be affected by a US slowdown. Growth in emerging Europe, however, was robust. The strong growth in the Middle East continues due to high oil prices and robust domestic demand. North America is the second largest HMI software market in the world. Private consumption growth slowed markedly in the face of rising gasoline prices and declining residential valuations, which continued to exert a significant drag on the economy.

Asia is the third largest HMI software market in the world. More manufacturers are expanding their operations in China due to lower labor costs, improving quality of education, and easing governmental policies for foreign direct investments (FDI). India's bright economic prospects have driven inflows, which in turn have given rise to rupee appreciation and excess liquidity. Higher crude-oil and commodity prices also put Japanese firms in a tight spot as rising costs drag down corporate profits. Latin America is the smallest regional HMI software market in the world. Growing global demand for metals, particularly by China, has kindled intense interest in South America's mineral wealth.

#### **Market Forecast**

ARC predicts that the Asia Pacific and Latin American HMI Software markets will be the fastest growing areas. North America and EMEA will be growing at a considerably slower rate. ARC believes that a significant amount of HMI Software adoption has already taken place in these mature markets, especially in the Automotive industry. HMI software will continue to replace proprietary software that is embedded in operator interface terminals as well as wireless devices, such as PDAs, tablet PCs, and mobile



phones. This will led to strong unit growth for Windows CE as an HMI software operating system. Growth will take place at a fast rate in the rapidly developing process industries, such as Oil & Gas and Water & Wastewater. HMI Software is penetrating deeper and deeper into these process applications and stretching across the entire enterprise.

Market Forecast through 2012 CAGR = 9.1%

There are many factors that will contribute to growth in the worldwide HMI software market through 2012. PLC-based PACs and DCS-based PACs are being deployed at an increasing rate in the fast growing process industries, and each of these PACs requires HMI software to best leverage their capabilities. Automation equipment, including PLC-based PACs equipped with HMI software, play an important role in sustainability initiatives as they help satisfy many "green" demands, including the visualization and control of AC drives, which saves significant energy. Manufacturers are deploying information technology that is based on industry standards, securely managing and standardizing IT infrastructure and visualization across multiple facilities, with standardization of visualization being a driving force in the growth of HMI software. HMI software is used as digital dashboards to show Key Performance Indicators (KPIs), such as Dynamic OEE, for the entire enterprise, and it generates reports of actual performance versus targets. Overall operational performance is affected by maximizing the visualization of the HMI software through leveraging the latest in technology, such as 64-bit computing, and deploying an operating system designed to optimize this hardware, such as Microsoft Vista or Server 2008.

1-4 • Copyright 2008 © ARC Advisory Group • ARCweb.com • For Internal Use Only

#### **Strategies and Recommendations for Success**

#### **Design HMI Software Optimized for Use in PACs**

HMI software suppliers must focus on developing product that is optimized for use in the PLC-based PACs and DCS-based PACs. For suppliers whose product portfolio includes PACs, the HMI software should be added as a critical component that brings visualization and Collaborative Production Management (CPM) together as part of providing multi-disciplined controller functionality. End users and OEMs can deploy common development tools for HMI software design and integration, which facilitates a highly distributed automated factory environment.

- Design HMI Software Optimized for Use in PACs
- Create User Friendly Migration Tools
- Develop a Business Case of the Benefits of 64-Bit Computing and Microsoft Vista or Server 2008
- Promote HMI Software as the Focal Point to Deploy CPS
- Provide Digital Dashboard Tools Focused On Sustainability and Energy Savings Applications

HMI software suppliers are typically strong in the Food & Beverage industry, which is both the largest HMI software vertical as well as one of the largest users of PACs. This will be the path of least resistance and should be the first target for HMI software suppliers to provide vertically oriented solutions for PACs. However, the Oil & Gas, Mining & Metals, Electric Power, and Water & Wastewater industries are projected to be the fastest growing users of PACs over the next five years. These four industries are projected to also be the fastest growing HMI software verticals.

This will present opportunities for HMI software suppliers to create new vertically oriented solutions for PACs and strengthen their presence in the process industries.

The issue is for HMI software suppliers whose product portfolio does not include PACs. Of the top eight suppliers based on revenue in the recent ARC worldwide PLC study, only four of those suppliers also appear in the market share charts of this HMI software study. Many partnerships between HMI software and PLC suppliers exist today, but most are not designed to leverage the PLC-based PAC trend. That creates tremendous opportunities for additional HMI software partnerships with the other 18 PLC suppliers to focus on PAC applications.

#### **Create User Friendly Migration Tools**

HMI software suppliers must focus on creating user friendly migration tools that help manufacturers move to the latest HMI software. Software migration remains one of the top issues and challenges that manufacturer's

**Strategies and Recommendations** 

face. Justifying capital spending on automation is becoming more and more difficult as manufacturers increasingly focus on getting the most out of their installed assets. As with any automation project, there must be a compelling business case and value proposition for migration, which poses the question, "When to migrate?" The possibility of an impending unplanned downtime event due to an unreliable HMI software system is the most urgent criterion that ARC uses to determine when the time is right for HMI software system migration. Other criteria include lack of support for the legacy HMI software system or operating system on the part of the supplier, limitations of the system preventing the manufacturer from taking

As with any automation project, there must be a compelling business case and value proposition for migration, which poses the question, "When to migrate?" advantage of an emerging business opportunity, or the old HMI software cannot cost-effectively support the new generation of information and automation technologies that are available, such as open networks, plant asset management applications, and production management applications.

The migration process itself, however, is not as important as the new HMI software system that is the target of the migration project. ARC advocates that manufacturers should view HMI software system migration in the same context as they would approach a supplier selection process. The new target system should provide a path toward continuous improvement and operational excellence (OpX). This presents tremendous opportunities for HMI software suppliers to focus on developing not only the migration tools, but helping the manufacturer prepare the business case for migration with the associated return-on-investment (ROI) and return-on-asset (ROA) calculations. This also presents tremendous revenue opportunities for HMI software suppliers to focus on the fast growing services bandwagon, providing the project planning and management necessary to ensure the success of every HMI software system migration.

## Develop a Business Case of the Benefits of 64-Bit Computing and Microsoft Vista or Server 2008

HMI software suppliers must help manufacturers to develop a business case of the benefits of deploying 64-bit computing and Microsoft's Vista or Server 2008 operating systems. Overall operational performance is affected by maximizing the visualization of the HMI software through leveraging the latest in technology, such as 64-bit computing and deploying an operating system designed to optimize this hardware, such as Microsoft Vista or Server 2008. Best results for the operator are obtained from presenting the most realistic representations of the process possible, developed through a collaborative design and implementation process between operators, process or design engineering, and operations management. However, manufacturers who have the desire to upgrade their HMI software to the latest operating system sometimes resist, because they feel that there are not sufficient tools to assist them in pain-free operating system migration, nor do they have data that documents the business case that time and budget spent on improved process visualization pays off very quickly in terms of operational improvement, reduced incidents and accidents, operator turnover, and absenteeism.

Overall operational performance is affected by maximizing the visualization of the HMI software through leveraging the latest in technology, such as 64-bit computing and deploying an operating system designed to optimize this hardware, such as Microsoft Vista or Server 2008. The fear of delays that could possibly have an adverse effect on production outweighs the potential business benefits of deploying the latest operating system, according to many manufacturers. In addition, manufacturers also fear potential problems that could be created by the release of patches and system service packs for the newest operating systems, such as Vista or Server 2008. These

manufacturers fear that these patches and service packs can potentially have adverse effects on productivity and the total cost of ownership.

HMI software suppliers must develop business cases that demonstrate to manufacturers how 64-bit Vista or Server 2008 HMI software visualization can be easily adapted to the operator's needs while incorporating the manufacturing process requirements for optimal operation. The operator can now focus attention on the process as a whole and avoid distraction when, for example, zooming into details. 64-bit Vista or Server 2008 HMI software visualization provides the operator with the closest rendering of the real process, and avoids the need to translate an operator's thinking into code, numbers, and tags. Operations improve when the operator is able to solve complex problems, which results in increasing KPIs and Operational Excellence.

#### Promote HMI Software as the Focal Point to Deploy CPS

HMI software suppliers need to promote HMI software as the focal point for manufacturers to deploy Collaborative Production Systems (CPS). ARC has developed many models to illustrate the collapse of barriers to information and the openness of systems and applications. However, there was no model that delved deeply enough into the relationships between automation, operations management, and engineering and design in the process, hybrid, and discrete industries. A different kind of view and a more explicit model was required to show the growing integration of the real time world of control applications with the transactional world of operations management, engineering, and design. For this purpose, ARC has developed a model for CPS, which clearly illustrates the increasingly collaborative relationships between these domains and how they interact with the rest of the manufacturing enterprise in a non-hierarchal manner.



ARC CPS Model Showing Collapsing of Boundaries between Production and Enterprise Systems Manufacturers desire a single environment where production management applications, such as plant asset management, performance management, and scheduling can plug seamlessly into the same communications infrastructure and environment as the basic control system functions, including HMI software, system engineering and configuration, and control. For the process, hybrid, and discrete industries, full realization of the CPS model would include a single system infrastructure that encompasses all types of control, from continuous process,

batch, logic, and motion control. This full spectrum of control functionality would exist in the same common infrastructure alongside the operations management applications, all sharing a common adoption of standards and work processes. HMI software supplier must embrace this CPS concept and demonstrate to manufacturers how their products and solutions enable this concept to be deployed.

### Provide Digital Dashboard Tools Focused On Sustainability and Energy Savings Applications

HMI software suppliers need to provide digital dashboard tools focused on sustainability and energy savings applications. Automation equipment, including PLC-based PACs equipped with HMI software, play an important role in sustainability initiatives as they help satisfy many "green" demands, including the visualization and control of AC drives, which saves

significant energy. HMI Software is presently used as digital dashboards to show KPIs for the entire enterprise, such as Dynamic OEE, throughput or downtime, and generates reports of actual performance versus targets. The visualization of metrics designed for sustainability and energy savings should be added to the portfolio of HMI software suppliers.

HMI software used to visualize energy savings helps manufacturers quantify the benefits of their automation investments. HMI software used to visualize energy savings helps manufacturers quantify the benefits of their automation investments. These energy savings benefits are key selling factors for automation

suppliers, and prevent these suppliers from missing out on opportunities by not supporting manufacturers with their investment justification process. Manufacturers are all too aware of escalating energy costs, as well as the need for automation equipment that not only can lead to more cost effective production, but also reduce the greenhouse effect and play a part in meeting emission targets. Manufacturers, however, must go through a business justification process to replace existing equipment that is less energy efficient. To this end, manufacturers need quantifiable figures to form a clear view of the benefits derived from upgrading their automation solutions.

HMI software suppliers should work with their service providers to develop programs that help manufacturers with the automation upgrade justification process, including, for example, plant level energy audits to identify high energy consuming applications and calculate the energy consumption that demonstrates the potential savings. For example, in many countries, energy savings derived from automation upgrades will generate additional revenues from energy trading over the grid and help to gain more carbon credits that those manufacturers can sell. These credits can be traded under the Kyoto Protocol. Some countries also offer tax incentives, such as higher depreciation and tax benefit claims on profits earned on investments made, towards energy conservation that are directly due to automation upgrades.

# Chapter 2 Scope

This outlook study is an effective planning guide for suppliers and users of Human Machine Interface (HMI) and related software. The report is specifically prepared to provide strategic information to industry executives responsible for planning, marketing, sales, and development of their company's plant automation business.

### **Key Issues Researched**

This in-depth analysis of the HMI and related software marketplace includes market size and segmentation, market forecast, industry structure, and supplier market shares and profiles. In addition to the quantitative assessment of the marketplace, this report explores in-depth the key issues which will impact this marketplace in the future. These issues include:

- How large is the market potential for HMI and related software, globally, and by region?
- Who are the leading suppliers of HMI and related software?
- What are the factors contributing to, and inhibiting, the growth of the HMI and related software marketplace, today and in the future?
- What does the "Related Software Business" entail, and what are its prospects for the future?
- What business potential does each major industry offer, and which industries will offer the greatest growth opportunities?
- Which sales channels are most effective in bringing HMI and related software to market, and how will that effect each of the user classifications?
- What are the key factors for success in the HMI and related software business?

This study is one of several studies available from ARC on manufacturing software. Each of these studies is specifically designed to help our clients lower their risk in making purchasing and business development decisions. ARC, through its extensive experience, and industry knowledge, is in a unique position to provide clients with the most in-depth information about manufacturing software and the global industrial automation marketplace.

#### **Market Size and Forecast Definitions**

Market size figures were derived from ARC's extensive in-house database and in-depth interviews with the leading suppliers of HMI and related software. ARC calculates the market size for 2007 (base year) in terms of shipments by industry participants, not by bookings or orders. These numbers and shares represent only dollars that are collected and retained by the suppliers, and do not represent the overall marketplace dollars spent on HMI and related software, as this information is difficult to impossible to collect and verify.

Market forecasts are based on a combination of factors including anticipated purchases reported by end users and OEMs, current and anticipated developments in software and related technologies, and ARC's assessment of growth potential for each market segment.



ARC CMM Model Showing Collapsing of Boundaries between Production and Enterprise Systems Data contained in this study reflect supplier revenues from HMI and related software. Supplier revenues exclude margins earned by distributors and reps selling the software, if applicable. Software, which is sold as part of a bundled hardware/software system solution, is excluded, e.g. application software bundled with a distributed control system or a PAC/PLC. Conversely, some control companies sell their HMI Software unbundled from their control systems. This software is included. Examples include GE Fanuc's Proficy HMI/SCADA iFIX and Siemens WinCC products.

Data contained in this study also reflect revenues from embedded HMI Software used in HMI hardware devices such as operator interface terminals as well as wireless HMI hardware devices, such as PDAs, tablet PCs, and mobile phones. Hardware devices sold as part of a bundled hardware/software HMI solution are excluded, e.g. ARC only includes the HMI Software license revenue derived from the sale of a touchscreen, but not the revenue from the touchscreen itself. In addition, data contained in this study reflects revenues from HMI and related software used as part of a Collaborative Production Management (CPM) software suite. Software module revenue used to directly support the HMI Software, such as configuration, runtime, connectivity, control, alarm management, etc. is included. Revenue related to other software that is sold as part of a CPM software suite, and not directly related to HMI Software, is excluded, such as change management, quality, down-time, tracking and tracing, metrics, OEE software, etc. That software is included in either ARC's Collaborative Production Management Software – Process Industries (CPM-P) study, or ARC's Collaborative Production Management Software – Discrete Industries (CPM-D) study.

Service revenues derived by HMI Software suppliers from sales of packaged software, such as maintenance contracts, training, and software configuration are included. A certain portion of service revenues can be attributed to software licenses through the packaging of upgrades, at no cost, within service contracts. The portion of service contracts at which these upgrades are valued are counted within services and therefore excluded from the software license category. Revenues not associated with HMI Software sales, such as development of custom software and system implementations where other devices, such as PACs/PLCs, are involved are excluded. Service revenues derived from full-scale systems implementation by systems integrators are also excluded, as well as service revenues related to any software that is part of a Collaborative Production Management Software suite not directly related to HMI Software, such as change management, quality, downtime, tracking and tracing, metrics, OEE, etc. are excluded.

#### **Key Currency Factors**

To eliminate changes in market size due to ongoing currency variations, ARC uses average exchange rates over a 12 month period running from October 1 to September 30 for the leading currencies. Each year, ARC updates the exchange rates used in our market analysis and forecasts to portray the most realistic picture of the market possible. When comparing ARC reports from different years, customers must take into account the ongoing changes in exchange rates that occur from year to year and use the exchange rates given in each study to convert back to local currencies. All ARC forecasts are prepared in current US dollars and are based on the assumption that the current inflation rate of approximately 3 percent will continue throughout the period covered by this report.

Country	National Currency (Abbreviation)	Exchange Rate National Currency units per US Dollar (\$)		
European Union	Euro (€)	.73		
Japan	Yen (¥)	118.2		

Average Currency Exchange Rates Used In ARC Market Studies

ARC provides a five-year forecast in order to show clients long term trends in this business. Today, however, the outlook for any business can dramatically change due to the rapidly changing technology and global economic environment. Therefore, we recommend that clients obtain the latest updates from ARC before making any important decisions.

#### **Key Regional Segments**

Geographically, ARC has divided the marketplace into four major segmentations: North America, Latin America, EMEA, and Asia. North America consists of the United States and Canada. Latin America is comprised of Central America, Mexico, and South America. EMEA consists of Western Europe, Eastern Europe, CIS, Africa, and the Middle East. Asia consists of Japan, China, India, Taiwan, South East Asia, Korea, and Australia.



**Geographic Segmentations** 

#### **HMI Software Functionality**

The complexity of this type of software can vary considerably. The majority of these software packages are used for HMI with a variety of control products, such as programmable logic controllers (PLCs), programmable automation controllers (PACs), or PC-based data acquisition systems.

In addition to the performance of HMI functions, many of these software packages are also used to perform monitoring functions, such as alarming, storing of data, and printing of management reports. Some of the more sophisticated packages also perform control functions. Script language programming is considered an inherent function of an HMI Software package and not considered as control programming.

This analysis also includes sales of related software by the HMI Software suppliers. These related software functions are typically packaged as optional add-on modules, or alternatively as components of a family or suite of products. One type of module is PC-based control, where the functions typically performed by a PLC, PAC or other controller are executed on standard PC hardware.

Another category is supervisory software, where production management functions are incorporated into the HMI Software. These segments indicate how HMI Software suppliers are expanding their application space and represent important growth areas for the HMI Software suppliers.

An HMI Software package typically performs most of the following functions:

- Process Visualization & Animation
- Data Acquisition and Management
- Process Monitoring and Alarming
- Management Reporting
- Database serving to other enterprise applications

In many cases, some of the following control functions are also performed by an HMI Software package:

- Basic Regulatory Control
- Batch Control
- Supervisory Control
- Statistical Process Control

There are several approaches to pricing software. Some methods include: price per module, price per client, price per server, price per runtime license, price per development license, price per I/O point, or some combination of these schemes. With regard to I/O point pricing, approaches vary considerably: some suppliers use database capacity, some use tag counts, and some use I/O point counts. The dominant trend among suppliers is to offer a component-based pricing structure. This permits end users to optimize their system according to the required functionality and attain the best price.

The practice of packaging and licensing software functions as modules, combined with other variables, has made the counting of licenses and the concurrent averaging of price per license misleading at best. ARC has used a system package as the unit of measure. A package is defined as a typical sale that provides an average level of defined functionality. It may (and often does) include multiple licenses.

#### **End User Industries and Key Industry Segments**

HMI Software can be found in a wide array of industrial markets that typically range from discrete parts manufacturing to the process and batch industries. Key industries covered in this report include Aerospace & Defense, Automotive, Chemical, Electronics & Semiconductor, Food & Beverage, Mining & Metals, Pulp & Paper, Oil & Gas, Pharmaceutical & Biotech, Electric Power, and Water & Wastewater.

ARC's Machinery segmentation differs slightly from the parameters of NAICS 333. For the purpose of this study, industry-specific machinery in NAICS 333 is allocated to the industry segment where it is used. For example, food-processing machinery is part of ARC's Food & Beverage products segmentation.

#### **HMI Software by Operating System**

ARC has segmented the HMI Software market by operating system. In this view, market size and five-year forecast show current and expected revenues for HMI Software packages as determined by the operating system used as the software platform. This is a key driver in the development of the HMI Software market in terms of customer preference and supplier differentiation.

All major suppliers to the HMI Software market offer packages that utilize Microsoft Windows XP as their software platform, and most have also added packages that utilize Microsoft Windows Vista as well. This is due to the fact that HMI Software packages are being driven towards Client/Server multi-tasking applications as opposed to running on standalone machines. This will slow the demand for older operating systems, such as Microsoft Windows NT/2000 that will still remain as a legacy system for a remaining installed base of stand-alone machines. Window Vista will also experience tremendous growth due to Microsoft's plan to phase out Windows XP in June 2008. However, some users are choosing not to migrate to Vista, because Windows XP is a very stable platform, and they need a more compelling business case to migrate towards Vista.

Windows CE has become the dominant operating system for HMI Software packages running on smaller, less powerful, dedicated devices, such as wireless remotes, low-cost HMI devices, etc. Windows CE strengths are the ability to run real-time applications without extensions; fit small applications where cost, size of memory and low power are major constraints; and run on specialized hardware platforms designed to minimize per unit costs.

As HMI Software is shifting from stand-alone computing towards Client/Server architecture, demand for the ability to view and/or control a process via the Internet or plant-wide intranets is increasing dramatically. This is increasing the demand for HMI "Thin-Client" products where one can view and/or control a process from a computer without HMI Software. The user, through a standard Web browser, will enter a Website address, enter a password, and based on the access level configured in the server, be able to view and/or control the process. Thin-client HMI Terminal Services software also lets users remotely execute applications. It offers some advantages, since it is typically part of the Web server's core operating system.

Other operating systems are still supported to meet the needs of legacy systems and certain real-time applications that require better performance than real-time extensions can provide. An example of a legacy system includes Windows 98/ME. An example of a real-time system includes VxWorks.

Other operating systems are beginning to develop greater platform support from the HMI Software packages, with the growth forecasted in this segment due to the inclusion of Microsoft Server Software such as Microsoft Server 2003 and 2008. This drive is caused by the market demand for improved collaboration between suppliers and plant floor operations, adding remote HMI Software viewing and control capabilities, increased HMI Software interaction with legacy systems and off-the-shelf hardware, and making plant control information more accessible to enterprise applications.

Applications in the Linux side are server-driven. VxWorks applications are driven by its very low per-license costs. Java is supported due to Sun Microsystems' initiative with control and software suppliers. Java provides base functionality for plant browsers on corporate intranets and over the Internet for thin-client HMI Software. It is used with the integration of manufacturing and corporate Intranets to provide portability and platform independence. HMI Software suppliers are keeping an eye on Linux to see if there is support developing at the user level. To date, there are few HMI Software packages available that use Linux as their software platform. It is being left up to some of the niche HMI Software suppliers, such as Vista Control Systems, to develop Linux packages and try to drive the advantages into the marketplace. Linux features include a free UNIX-type operating system with true multitasking, virtual memory, shared libraries, demand loading, memory management, TCP/IP networking, and other features consistent with UNIX-type systems. Developed under the GNU General Public License, the source code for Linux is available to everyone at no cost.

#### **HMI Software by Customer Type**

ARC has segmented the HMI Software market by customer type. In this view, customers are segmented into three main types: end users, OEMs, and systems integrators. End users are the typical customers using HMI Software in applications in, for example, automotive, food & beverage, semiconductor, and electronics plants.

ARC's definition of Systems Integrators (SIs) as a customer type includes consultants, Architects, Engineers & Constructors (AECs), and all types of systems houses. Consultants excel in front-end planning, coupled with implementation of software packages for financial and manufacturing control. Many consulting firms got started with financial and manufacturing software packages and then expanded their market penetration to industrial automation. Some have opened SI showcase centers in key cities. Others are aggressively pursuing integration partners among leading hardware and software vendors.

AECs such as Bechtel are best known for managing large plant construction projects. Diminishing availability of large projects has prompted many AECs to expand their services to include automation implementation. Many end users will depend on AECs to specify and provide control systems. Very often, the AEC will be employed to implement the system as well. AECs have extensive experience with HMI Software, DCSs, PLCs, PACs, and operator workstations.

Small SI firms are generally located near industrial centers and specialize in a few related niches. These companies often work as an extension of an end user's staff. On small and simple projects, many end users prefer to work with local independent SIs, because they are nearby and are less expensive than large SIs or equipment suppliers.

OEMs, or original equipment manufacturers, are an important customer type for virtually all control products except DCSs. OEM machinery is a key market for HMI Software, PLCs, PACs, industrial drives, and operator workstations. Some examples of OEM applications are plastics or packaging machinery where the machinery supplier purchases control products, embeds them in their machine, and then sells the machine to the end user as a value-added product.

A given machine may incorporate a number of different control products including HMI Software, a PLC, a PAC, a temperature controller, and an operator workstation. OEMs may or may not put their own label on the purchased control products. Plastics machinery, packaging equipment, printing presses, and all types of industrial machinery are important OEM applications.

#### **HMI Software by Sales Channel**

ARC has segmented the HMI Software market by direct sales channels, independent representatives and distributors, Systems Integrators/Value Added Resellers (SIs/VARs), and the Internet. Direct sales channels are sales made through the supplier's in-house permanent sales staff.

Industrial distributors are a widely used distribution channel for HMI Software, PLCs PACs, industrial drives, workstations, and industrial computer and software products. Industrial distributors stock control products from a variety of suppliers for sale to end users within their geographic territory. The distributor tries to have complementary products, so when their salesperson calls an account, there is something in the line card that is needed. Industrial distributors are geared more toward selling off-the-shelf software and electrical equipment, such as industrial drives, PLCs, and relays, as opposed to customized software and process control equipment.

With the availability of order placement via the web and overnight shipping, suppliers have been re-evaluating the role of their distributors. Distributors understand this, and many have re-evaluated their business models. The level of "value added" provided by industrial distributors varies tremendously. The lowest level is local stock and order management. Adding product and application expertise allows for higher levels of service to the end user. The chosen level is dependent on the market strategies of the supplier and distributor. With the increased emphasis on services in the industrial marketplace, many distributors are adding more value to their equipment sales. Consequently, some distributors are becoming more involved in control system configuration and implementation.

Independent representatives (reps) are firms contracted to sell products from a number of different control product companies within a given geographic territory. Control product suppliers use this channel due to the reps' established relationships with local customers and familiarity with the requirements of the local marketplace. Product lines carried typically include single station process controllers, industrial I/O, data acquisition equipment, application software, such as HMI and CPM Software, and other products. Independent rep firms may or may not inventory control equipment, and are typically called stocking reps if they do. Independent reps are more associated with the process side of the business, while distributors are typically associated with the discrete portion.

HMI Software suppliers rely on industrial distributors and reps for distribution to traditional markets in machine control and discrete parts manufacturing, but SIs and VARs are becoming more important as a sales channel as well. SIs/VARs are companies that purchase hardware and software from various sources, add value by configuring into a system or package, and then sell the configured system or package to the end user. Often, the SI/VAR sells something (e.g. computers) made by another company (an OEM) with extra components added (e.g. specialist software) for a specific end user application. SIs/VARs are playing an increasingly important role in the industrial marketplace for selling, for example, HMI Software used in batch control and other applications in the process industries. Currently, there are a large number of companies providing SI/VAR services to end users.

The Internet has become a fast growing distribution channel for automation suppliers. Internet-based ordering systems from automation suppliers offer end users an easily accessible alternative for purchasing automation solutions and for obtaining technical documentation and customer support information. In ARC's view, suppliers that do not embrace Internet-based distribution strategies will lose their competitive edge. The Internet is best for order entry and monitoring shipments, however, local representation will continue to be needed for clear customer understanding and selling.

## Figure 2-1

## **Standard Industry Code Classifications - Process Industries**

Process Industries	SIC Code	NAICS Code	NACE Code
Cement & Glass	32	327	26.1-26.8
Chemical & Petrochemicals	28 (except 283 & 284)	325 (except 3254 and 3256)	24.1, 24.2, 24.3, 24.5, 24.6, 24.7
Electric Power (Generation , T&D)	491, 4931	2211	40.1
Food & Beverage	20, 21	311, 312	15.1-15.9, 16.0
Metals (Primary Production)	33	331	27.1-27.5, 37.1
Mining	10, 12, 14	212	10.1-10.3, 12, 13.1-13.2
Oil & Gas (Exploration, Production)	13	211, 213111, 213112	11.1, 11.2
Oil & Gas (Pipelines)	46, 492	486, 2212	40.2, 60.3
Oil & Gas (Refining)	29	324	23.1, 23.2
Pharmaceutical & Cosmetics	283, 284	3254, 3256	24.4, 24.5
Pulp & Paper	26	322	21.1, 21.2
Textiles	22	313, 314	17.1-17.7
Water & Wastewater	494, 495	2213	41, 90

Discrete Industries	SIC Code	NAICS Code	NACE Code
Aerospace & Defense	372 & 376	3364	35.3
Apparel, Footwear & leather products	23, 31	315, 316	18.1-18.3, 19.2-19.3
Automotive	371, 375, 379	336	34.1-34.3, 35.4-35.5
Building Automation	15, 3534, 3564	3339, 3334	45.4
Electrical	36 (except 365,366,367)	335	31.1-31.6
Electronics & Semiconductors	357, 365, 366, 367	3341, 3342, 3343, 3344, 3346	30.0, 32.1- 32.3
Fabricated Metal Products	34	332	28.1-28.7
Furniture & Wood Products	24, 25	3219, 3371, 3372	20.1-20.5, 36.1
*Machinery	35 (except 357)	333	29.1-29.7
Medical Products	384, 385	3391	33.1
Plastic & Rubber Products	30	326	25.1, 25.2
Printing & Publishing	27	511, 323	22.1-22.3
Other Discrete	381, 382, 386, 387, 39	3345, 3399	33.2-33.5, 36.2-36.6

## Figure 2-2

## **Standard Industry Code Classifications - Discrete Industries**

\*"While most machinery manufacturers fall under this segment, there is also a large quantity of OEM equipment that ARC accounts for within the respective end user industries, which is excluded from the Machinery Industry. For example, controllers purchased as OEM components for food processing or food packaging machinery is included in the figure for the food & beverage industry and is not included in Machinery."

## Figure 2-3

## **Standard Industry Code Classifications - Service Industries**

Service Industries	SIC Code	NAICS Code	NACE Code
Retail - Food & Beverage	54	445	52.2
Retail – Other	52, 53, 55, 56, 57, 58, 59	44 (except 445), 45	52 (except 52.2)
Wholesale/Distributor - Food & Beverage	514	4224, 4228	51.3
Wholesale/Distributor - Other	50, 51 (except 514)	42 (except 4224, 4228)	51 (except 51.3)
Transportation & logistics	42, 44, 45, 47	481, 482, 483, 484, 488, 492, 493	60.2, 61.1- 61.2, 62.1- 62.2, 63.1- 63.4, 64.1

## Figure 2-4 **HMI Software Questionnaire**

#### Human Machine Interface and Related Software Worldwide Outlook

This study covers Human Machine Interface Software and Services. This analysis also includes sales of related software by the HMI suppliers, which are typically packaged as optional add-on modules or alternatively as components of a family or suite of products. Service revenues derived by software suppliers from sales of packaged software such as maintenance contracts, training, and software configuration, are included. Revenues not associated with software sales, such as development of custom software and system implementations where other devices such as PLCs are involved, and services revenues derived from full-scale systems implementation by systems integrators are excluded. Data contained in this study reflect supplier revenues from packaged software. Supplier revenues exclude margins earned by distributors and reps selling the software, if applicable. Software, which is sold as part of a bundled hardware/software system solution, is excluded.

Human Machine Interface Software HMI Software Supplier		HMI Tab for Entry	Analyst Name: e-mail: Telephone #:	Analyst Name: Craig Resnick e-mail: cresnick@arcweb.con Telephone #: 781-471-1157		
Note: Millions of \$s			Note: Thousands of Units			
<u>Description</u> Last vs. Current	<u>%</u>	<u>\$</u>	Description	<u>%U ni ts</u>	<u>Units</u>	

Last vs. Current		
	2006	0.0
	CAGR	#DIV/0!
	2007	0.0
Please estimate Next	Year's % Growth	0.0%
Revenue Category		
Software Revenues	0.0%	0.0
Service Revenues	0.0%	0.0
Total	0.0%	0.0
1 Otal	0.070	0.0
World Degion		
World Region	0.000	
North America	0.0%	0.0
EMEA	0.0%	0.0
Asia	0.0%	0.0
Latin America	0.0%	0.0
Total	0.0%	0.0
Asia by Country		
Japan	0.0%	0.0
China	0.0%	0.0
Rest of Asia	0.0%	0.0
Total	0.0%	0.0
Industry		
Aerospace & Defense	0.0%	0.0
Automotive	0.0%	0.0
Compart & Class	0.0%	0.0
Cerreira & Glass	0.0%	0.0
	0.0%	0.0
Electrical & Appliances	0.0%	0.0
Electronics & Semiconductors	0.0%	0.0
Fabricated Metals	0.0%	0.0
Food & Beverage	0.0%	0.0
Machinery Manufacturing	0.0%	0.0
Mining & Metals	0.0%	0.0
Oil & Gas	0.0%	0.0
Refining	0.0%	0.0
Pharmaceutical & Biotech	0.0%	0.0
Electric Power	0.0%	0.0
Pulp & Paper	0.0%	0.0
Water & Wastewater	0.0%	0.0
Medical Products	0.0%	0.0
Building Automation	0.0%	0.0
Household & Personal Care	0.0%	0.0
Othor	0.0%	0.0
Total	0.0%	0.0
Total	0.078	0.0
Software Type		
Human Machino Intorfaco	0.09/	0.0
	0.0%	0.0
	0.0%	0.0
Supervisory	0.0%	0.0
	0.0%	0.0
lotal	0.0%	0.0
Sales Channel	<b>6 6</b> 6	
Direct Sales	0.0%	0.0
independent Representatives/D	ISUIDU 0.0%	0.0
Systems Integrators/Value Adde	ed Res 0.0%	0.0

Description		<u>%U ni ts</u>	<u>Units</u>	
Units				
	2007			0.00
Unit by Operating Systems				
Windows Vista		0.0%		0.00
Windows CE		0.0%		0.00
Windows NT / 2000		0.0%	1	0.00
Windows XP		0.0%		0.00
Legacy Windows		0.0%		0.00
Linux		0.0%		0.00
Terminal Services		0.0%	1	0.00
VxWorks		0.0%		0.00
Java		0.0%		0.00
Other		0.0%		0.00
Total		0.0%	-	0.00

## Figure 2-4 (Continued) HMI Software Questionnaire

Internet	0.0%	0.0
Total	0.0%	0.0
Customer Type		
Original Equipment Manufacturers	0.0%	0.0
Systems Integrators	0.0%	0.0
End Users	0.0%	0.0
Total	0.0%	0.0
Operating System		
Windows Vista	0.0%	0.0
Windows CE	0.0%	0.0
Windows NT / 2000	0.0%	0.0
Windows XP	0.0%	0.0
Legacy Windows	0.0%	0.0
Linux	0.0%	0.0
Terminal Services	0.0%	0.0
VxWorks	0.0%	0.0
Java	0.0%	0.0
Other	0.0%	0.0
Total	0.0%	0.0

Please Answer The Questions in The Space Below

1. What new products did you announce this year? How did your product and/or company change?

2. What really differentiates your HMI /SCADA software and your capabilities from the competition?

3.What kind of Service offerings does your company offer (i.e. Professional Services, Training, Support and Maintenance) and is your service revenue growing faster than your software revenue?

4. Do you OEM your HMI software to other companies and if yes, who is the company and what % of your previous calendar year's total sales revenues did it account for?

5. Does your company OEM software from another HMI Software Company and if yes, who is the company and what % of your previous calendar year's total sales revenue did it account for?

6. What is your company's offering of embedded and /or wireless HMI products and in what types of devices, operating systems, and applications do you sell those products?

7. Do you offer Thin Client HMI and what is your company doing to offset the losses in license revenue?

8. Do you have any plans to develop applications for OPC-UA now or in the future?

9. Do you agree that the HMI market has shifted and is part of a set of software applications that address collaborative manufacturing, manufacturing visibility/intelligence, and production and process optimization?

10. Do you have any current or future plans to include MES/CPM applications to your HMI portfolio, and do you consider the MES/CPM space as an extension to HMI functionality?

11. Please describe which of your competitors are changing, who is leading, rising, and falling?

12. What are the key criteria that you see your OEM's using to choose an HMI/ SCADA vendor?
# Figure 2-4 (Continued) HMI Software Questionnaire

13. What are the key criteria that you see your End User's using to choose an HMI/ SCADA vendor

14. What new influences/trends do you see on the horizon that you believe will affect HMI technology or business?

15. What strategies and recommendations would you make to be successful in the worldwide HMI software market?

16. What geographic trends do you see in the HMI software market?

17. What industry trends do you see in the HMI software market?

18. What factors do you see contributing to growth in the HMI software market?

19. What factors do you see inhibiting growth in the HMI software market?

20. What trends do you see in the area of supervisory and control functional modules?

21. What trends do you see in the area of operating systems and average sales price?

22. What trends do you see in the area of distribution channels?

23. What trends do you see in the area of OEMs, End Users, and systems integrators?

# Chapter 3 Market Shares

The worldwide HMI Software market experienced strong growth over the last two years, growing at 19.3 percent CAGR. There has been a significant amount of growth as a result of two primary factors. First, HMI software suppliers continued to add services at an accelerated rate, driven by the end users' and OEMs' need for technical support, because they no longer have the personnel internally to provide the services. Services related to HMI software grew 32.7 percent CAGR over the past two years, versus 16.3 percent for purely HMI software. Service revenues include sales of packaged software, such as maintenance contracts, training, and software configuration. A certain portion of service revenues can be attributed to software

The worldwide HMI Software market experienced strong growth over the last two years, growing at 19.3 percent CAGR. licenses through the packaging of upgrades, at no cost, within service contracts. The portion of service contracts at which these upgrades are valued are counted within services and therefore are excluded from the software license category.

Second, Supervisory HMI software, which is used to support HMI software functionality, such as configuration, runtime, connectivity, control, and alarm management, had the fastest growth of any HMI software type. Supervisory software, which grew 24.5 percent CAGR over the past two years, is where production management functions are incorporated into the HMI software. Growth in this segment indicates how HMI software suppliers are expanding their application space and represent the direction that the HMI software market is heading for the future. Other Supervisory functions include process visualization and animation, data acquisition and management, process monitoring and alarming, management reporting, and database serving to other enterprise applications.

As expected, Windows XP was the fastest growing operating system in terms of revenue, with a growth rate of 29.3 percent CAGR over the past two years, growing from 48.1 percent of the total HMI software market revenue in 2005 to 59.5 percent of the total HMI software market revenue in 2007. However, Windows CE was the fastest growing operating system in terms of units, with a growth rate of 39.9 percent CAGR over the past two years. This has led Windows CE to be the HMI Software operating system in over 23 percent of the units sold in 2007, up from over 18 percent of the

units sold in 2005. This growth was due to Windows CE replacing proprietary software embedded in devices, such as operator interface terminals and the increased deployment of HMI on wireless devices, such as PDAs, tablet PCs, and mobile phones.

HMI software suppliers had their best regional development in Asia, with a growth rate of 24.1 percent CAGR over the past two years. China is now at 30.1 percent of the total HMI software Asia market, with Japan at 10.8 percent, and the balance of Asia is at 59.2 percent. North America and EMEA also experienced strong growth of 17.1 percent and 20.5 percent CAGR respectively. The common denominator was growth of HMI software

Common denominators among the leading HMI software suppliers were a strong global presence in China and Eastern Europe, the ability to provide scalable open systems, and having key presence in industries, such as Automotive, Food & Beverage, Mining & Metals, Electric Power, Water & Wastewater, and Oil & Gas. solutions tied to Programmable Automation Controllers in the process and hybrid industries, led by Oil & Gas at 37.2 percent CAGR over the past two years. The Food & Beverage industry, which grew 22.8 percent CAGR over the past two years, increased from 13.3 percent in 2005 to 14.1 percent in 2007 of all HMI software revenue, maintaining its leading industry position.

Common denominators among the leading HMI software suppliers were a strong global presence in China and Eastern Europe, the ability to provide scalable open systems, and having key presence in industries, such as Automotive, Food & Beverage, Mining & Metals, Electric Power, Water & Wastewater, and Oil & Gas. These HMI software suppliers could optionally provide the hardware that their systems are installed on, which is a very attractive option for a lot of end users who are looking for convenience and seamless interoperability. These HMI software suppliers also could optionally provide software modules that provide production management or MES capability, such as historians, OEE, tracking & tracing, etc. These HMI software suppliers provided excellent service through 24/7 support and through a comprehensive network of global solution providers and channels. These HMI software suppliers are strong advocates of OPC-UA, which is critical in determining whether a supplier will succeed in providing interoperability between the plant floor and enterprise as well as other automation products. These HMI software suppliers leveraged already established global brands that have an advantage, because they are already well known in the markets they are trying to enter.

## **Total HMI and Related Control Software Business**

#### Siemens

Siemens is the global market share leader in HMI software revenue by a close margin, propelled by acquisitions as well as the benefits of a strong currency. Siemens maintains their strong HMI software revenue market share leadership position in the EMEA region. Siemens' main HMI Software product line is known as SIMATIC WinCC. In 2007, Siemens acquired UGS, which two years earlier had acquired Tecnomatix, which had acquired US Data several years earlier. This acquisition adds the

Siemens is the global market share leader in HMI software revenue by a close margin, propelled by acquisitions as well as the benefits of a strong currency. FactoryLink product line of HMI software to the Siemens portfolio. FactoryLink V8 will be available for the next several years. Also, the Austrian company ETM was acquired by Siemens in 2007. ETM's HMI Software product offering is targeted at very large scale applications and for geographically widely distributed systems.

Siemens offers SIMATIC WinCC and WinCC flexible. WinCC Client/Server HMI/SCADA software incorporates Internet technology, open standard interfaces, and configuration tools. WinCC is a scalable application running under Microsoft Windows 2000/XP/Vista. WinCC is used in discrete and process control applications across most manufacturing industries. SIMATIC WinCC flexible is the HMI software package under Windows for all applications close to machines and the process in machine-tools, serial machine-tool building, and plant engineering. The engineering software is based on Microsoft .NET technology and allows users to carry out consistent configuration of all SIMATIC HMI operator panels. WinCC flexible shares a common configuration environment that supports the transportability of applications over a wide range of hardware platforms, including standard Windows 2000/XP and Vista platforms, as well as the Siemens' line of dedicated operator interface platforms.

In the future, Siemens will offer one HMI Software package that will cover scalable platforms from low end operator panels to high end SCADA systems, offering multi-user redundant solutions and Plant Intelligence functionality. Siemens continues to pursue broad-based licensing of the Windows CE and XP embedded operating system to target embedded devices for automation applications. This is significant since a collaborative manufacturing environment will rely on embedded intelligence at the device level. The Siemens-Microsoft relationship encompasses a broad range of industrial, communication, consumer, and IT application products.

## Wonderware

Wonderware is number two in global market share in HMI software revenue by a close margin. Wonderware maintains their strong HMI software revenue market share leadership position in the Latin America region. Wonderware's Supervisory HMI software, based on Microsoft Windowsbased operating systems, is used throughout the process and discrete industries and has an installed base of over 500,000 applications in over 100,000 plants worldwide. Wonderware software is supported across Microsoft Windows 95/98/NT/2000/XP/2003 and Vista operating systems. Wonderware has changed their traditional HMI software packaging model by combining development tools for all of their products into customer oriented bundles for Supervisory HMI, SCADA, and Production & Per-

Wonderware has changed their traditional HMI software packaging model by combining development tools for all of their products into customer oriented bundles for Supervisory HMI, SCADA, and Production & Performance Management. formance Management. Wonderware combines integrated process visualization tools with realtime plant information and automation management, Internet connectivity, real-time SQL historical data capture, wide comprehensive device integration and a range of Industrial Computers with pre-installed software.

Wonderware's Industrial Computer range includes Touch Panels, Tablets, "Box" PCs, Thin Client computers, and Wonderware Compact Panels based on the Microsoft Windows CE Offering. Wonderware's Production & Performance Management Software provide a manufacturing software solution that enables real-time management of Equipment Operations, Equipment Performance, Manufacturing Quality, Manufacturing Performance, Manufacturing Execution, Batch Execution and Enterprise Integration. Wonderware products support OPC-UA and a library of over 325 protocol drivers to connect to legacy plant systems and equipment.

In addition to InTouch, Wonderware has released upgrades of its Wonderware Historian and Wonderware System Platform product offering. The Wonderware System Platform provides a unified environment for visualization, plant history, device communications and application integration. Wonderware has embraced thin client computing with the introduction of the Wonderware Information Server software that embeds Microsoft SharePoint technology. Additionally, Wonderware InTouch provides support of Terminal Services. Wonderware expanded their offerings with the introduction of an industrial thin-client computer offered in either an ACP ThinManager-ready thin client or a standard Microsoft RDP-based thin client.

## **Rockwell Automation**

Rockwell Automation is number three in global market share in HMI software revenue. Rockwell Automation maintains their strong HMI software revenue market share leadership position in the North America region. FactoryTalk View Site Edition (formerly RSView SE) includes runtime servers and clients that allow manufacturers to develop and deploy a multiserver/multi-client application along with a station-level version for a traditional single computer solution. FactoryTalk View SE supports the Microsoft Windows Server 2003 and Microsoft Windows XP operating systems and is targeted at manufacturers looking to meet regulatory

FactoryTalk View SE provides both HMI and data server redundancy enabled by FactoryTalk to help critical data remain available to clients, even during server disruptions. compliance requirements through documentation of electronic signatures and information security. FactoryTalk View SE provides both HMI and data server redundancy enabled by FactoryTalk to help critical data remain available to clients, even during server disruptions.

FactoryTalk View Machine Edition (formerly RSView ME) is a machinelevel HMI that supports both open and embedded operator interface solutions for monitoring and controlling individual machines or small processes. FactoryTalk View ME allows for a common operator interface across multiple platforms, including Microsoft Windows CE, Windows XP, Windows 2000, and Windows Vista solutions. Both PanelView Plus and VersaView industrial computers include FactoryTalk View ME Runtime for running machine-level HMI applications.

FactoryTalk View Studio is the common development and testing environment for both FactoryTalk View SE and FactoryTalk View ME applications. It allows for remote editing of HMI servers in distributed FactoryTalk View SE applications. FactoryTalk View SE and FactoryTalk ME include FactoryTalk Security, runtime language switching, and global objects. FactoryTalk Security authenticates user identities and authorizes user requests to access a FactoryTalk-enabled system. FactoryTalk Security's user authentication determines who can open, create, modify, and delete application components, as well as on which computers the actions are allowed. RSView32 supports Windows 95, 98, NT, 2000, XP, Vista, and Windows Server 2003 operating systems. RSView32 features include the integration of Visual Basic for Applications as its built-in programming language. RSView32 can perform as both an OPC Client and as an OPC Server, giving the manufacturers flexibility in integrating the software with controllers and third-party software modules.

## **GE Fanuc**

GE Fanuc is number four in global market share in HMI software revenue. GE Fanuc maintains a solid number three position in HMI software revenue market share in the North America, EMEA, Asia, and Latin America regions. GE Fanuc's four HMI-related applications are Proficy HMI/SCADA iFIX, Proficy HMI/SCADA CIMPLICITY, Proficy Machine Edition View, and DataViews. Proficy is an open, scalable, family of software products, delivering HMI/SCADA applications along with production management products. As GE Fanuc continues to invest in iFIX and CIMPLICITY, there will be an increased use of common components

As GE Fanuc continues to invest in iFIX and CIMPLICITY, there will be an increased use of common components that leverage the strengths of the products while continuing to provide new value to manufacturers. that leverage the strengths of the products while continuing to provide new value to manufacturers. CIMPLICITY and iFIX are both tightly integrated into the overall Proficy solution, enabling customers to leverage their investment in their HMI/SCADA systems while scaling their system to include MES and production management solutions.

iFIX, part of GE Fanuc's acquisition of Intellution, provides process monitoring and control, data collection, graphic display, historical reading, alarming, data archiving, and security for an unlimited number of I/O points. iFIX is compatibility with Microsoft Windows 2000/XP/Vista and Server 2003. iFIX also is GE Fanuc's predominant solution in the Pharmaceutical and Biotechnology industries, compliant with 21 CFR Part 11 regulations. CIMPLICITY has roots that trace back more than 25 years as a tool used by GE's corporate consulting organization for large project implementation. CIMPLICITY supports Windows 2000/NT/XP/Vista/CE and has an OPC Client and Server for both data and Alarms and Events.

Proficy Machine Edition provides interoperable machine-based HMI, motion, and control technology. It is suited for machine OEMs and connects into higher-level systems to accommodate collaborative manufacturing. Proficy Machine Edition View, the HMI application, is an intuitive machine-level graphical interface for shop-floor devices including PACs, PLCs, CNCs, motion controllers, marquees, serial devices, and other machinelevel components. DataViews, which GE Fanuc acquired from Dynatech Corporation, helps users build graphical software displays for visualizing information used to control and monitor real-time processes. Programmers use DataViews to create their own HMI while maintaining their chosen programming languages and platforms.

## **Schneider Citect**

Schneider Citect is number five in global market share in HMI software revenue. Schneider Citect maintains their strong HMI software revenue market share leadership position in the Asia region. Citect's strategy has been to leverage their systems integration background to build HMI/SCADA software packages that are scalable and have the ability to target applications with large I/O point counts, which are looking for a lower cost than the typical DCS system. Citect systems are only sold one way, as a complete, integrated package, with all the protocols and drivers included. Citect currently offers numerous applications modules including CitectHMI; CitectSCADA; CitectSCADA Pocket; CitectSCADA Batch; CitectFacilities; CitectSCADA Reports; and a suite of manufacturing execution systems Ampla modules including Metrics, Production, Down-

Citect systems are only sold one way, as a complete, integrated package, with all the protocols and drivers included. time, Maintenance, Recipe, Planner, Knowledge, Tracking and Quality. For Schneider Electric, Citect has developed new two products called Vijeo Citect and Vijeo Historian, which offer integration with Schneider Electric products, including PLCs, PACs Web Servers, and HMI panels.

CitectSCADA interfaces to hundreds of different I/O devices, including PLCs, PACs, RTUs, and DCSs from over 100 manufacturers. During 2007, CitectSCADA introduced the next generation, version 7, which included the ability to cluster multiple systems together, and they introduced client-side online changes. CitectSCADA Batch is a scalable batch management solution marketed at applications seeking lower Total Cost of Ownership (TCO), increased productivity and consistent quality. Based on CitectSCADA, CitectHMI is an entry level HMI software designed and sold exclusively to OEMs. CitectHMI operates on embedded Windows platforms and is used in a variety of OEM applications targeted at both Machine and Panel OEMs. CitectSCADA Reports is a historian combined with a plant-wide reporting tool that collects, histories and reports on data from HMI/SCADA systems using industry standard technology.

CitectFacilities is a PC-based system for integrating multiple networks to monitor and control security, HVAC, lighting, electrical distribution, fire detection, elevators, and related building, facility and shipboard management reporting functions. Centralized monitoring allows facility managers to monitor energy efficiency and security and integrate reporting to IT systems across wide area networks. CitectFacilities can also connect to video monitoring, card-based access, and record keeping for additional security.

# **Market Shares by Region**

# Europe, Middle East, & Africa

The Europe, Middle East, & Africa (EMEA) region is the largest HMI software market in the world. Western Europe comprises the majority of the HMI software business within this segmentation. The EMEA revenue share of the HMI software market rose from 40.3 percent of the worldwide HMI software market in 2005 to 41.1 percent in 2007. In Europe, growth does appear to be decelerating and will certainly be affected by a US slowdown. Inflation has increased in the US and in the Euro areas, largely reflecting pressures from energy and other commodity prices. The euro's ascent is pinching European exporters by making their products less competitive in international markets. High oil prices and shaky credit markets are also having an effect. The European business cycle lags behind the US, so European manufacturers are still riding a strong tail end of the investment cycle there.

Inflation has increased in the US and in the Euro areas, largely reflecting pressures from energy and other commodity prices. The euro's ascent is pinching European exporters by making their products less competitive in international markets. Growth has been driven by a broad-based acceleration in investment spending, especially in Germany, in response to high regional and global demand for machinery and equipment, a pickup in construction, and robust exports. In the United Kingdom, the expansion has continued at a strong and steady pace. According to the UK-based Engineering Employers' Federation (EEF), 2007 was the best year in a decade

for UK manufacturers, but current economic woes in the US and elsewhere are clouding the future outlook. The manufacturing sector in the UK declined during the last part of 2007.

In Norway, Sweden, and Switzerland, growth was also sustained in 2007. But recent data provides mixed signals about the likely growth performance of the Western European economies in the coming quarters, with the recent financial market turbulence and weaker growth in the United States are pointing to a likely slowdown.

Manufacturing production in the 13 countries that form the Eurozone rose in 2007, but at a declining rate. German manufacturers enjoyed the most robust growth dynamics and the most consistent order books, while the French and Italian producers suffered. In France, the industrial production index decreased between October 2007 and November 2007.

# **Emerging Europe (Eastern and Central Europe)**

Growth in emerging Europe was robust. Spending on new production capacity and construction activity bolstered investment, while rising disposable incomes and improving labor markets continued to prop up consumer spending. Exports benefited from an upswing in Western Europe, the main trading partner, as well as the increased integration of emerging Europe into regional production chains and the upgrading of the quality of its export products.

The outlook for the Czech Republic, Hungary, Poland, and Slovakia looks promising. Growth rates are sliding, but production is still rising at near double-digit rates, led by Slovakia on the strength of its booming automotive and components sectors. In Central Europe, the growth markets included television and radio transmitters, fabricated metals, and machinery. The automation growth in Eastern Europe will continue as governments provide an attractive investment climate that includes low flat tax rates for wages and corporate profits and incentives for investment financing. Although wages are rising, the region offers a much lower labor cost environment compared to Western Europe. Continuing investments in manufacturing facilities will provide a healthy environment for automation equipment growth.

## **Middle East**

The strong growth in the Middle East continues due to high oil prices and robust domestic demand. GDP growth in oil-exporting countries was sustained by expansion in the non-oil sectors, pushed by rising government spending out of oil revenues, foreign capital inflows, and rapidly growing domestic private credit. A buildup of government spending on infrastructure and social projects, as well as investment programs to expand oil production and refining capacity, is expected to benefit automation.

Other important macroeconomic shifts are also occurring in the Middle East. With availability of cheap energy and proximity to Asian markets, some states in the Middle East are producing metals and chemicals. In addition to oil drilling, the Middle East is also focusing on other related activities, such as LNG production and converting gas directly into diesel fuel. Other important macroeconomic shifts are also occurring in the Middle East. With the availability of cheap energy and proximity to Asian markets, some states in the Middle East are producing metals and

chemicals. These expansion activities provide much-needed employment for the region's rapidly growing workforce. All of these activities demand greater use of automation equipment in this region.

## **North America**

North America is the second largest HMI software market in the world. The North America revenue share of the HMI software market fell from 38.2 percent of the worldwide HMI software market in 2005 to 36.8 percent in 2007. Following a weak start to 2007, the US economy rebounded in the second quarter, growing by 3.8 percent (annualized rate). Net exports and business investment provided a boost to growth. However, private consumption growth slowed markedly in the face of rising gasoline prices and declining residential valuations, which continued to exert a significant drag on the economy. Recent data paints a weaker picture of the US economy

The recession risks have increased with an intensification of the housing sector and related financial market strains, which reflect weakening personal consumption spending, employment, and consumer sentiment. going forward, reflecting in part the impact of the turmoil in the financial markets. The recession risks have increased with an intensification of the housing sector and related financial market strains, which reflect weakening personal consumption spending, employment, and consumer sentiment.

The manufacturing sector related to the Automotive and Housing industries struggled in 2007. The US manufacturing sector is now losing some altitude as the effect of a weak dollar fades in the face of the overall economic climate. Electrical equipment, computer, and electronic businesses remained resilient during the last quarter of 2007, although machinery orders have declined. The US manufacturing sector is still being supported by strong global demand, but business spending is looking increasingly shaky and expectations have turned mild.

The Federal Reserve is cutting interest rates and pumping more money into the banking system to boost the economy. The US government has also agreed on an economic stimulus package. Canada also has eased interest rates.

Canadian manufacturing revenues actually increased by a modest 1.1 percent in November 2007, according to a recent Canadian Monthly Report on Manufacturing. Most of the increase was due to a 7.7 percent jump in the sale of petroleum and coal products (also accompanied by price increases of 7.3 percent). Durable goods, however, also experienced an increase in sales of 0.8 percent for November 2007. This is all good news, since the recent trend in Canadian manufacturing has been an overall downward trend for much of 2007.

#### Asia

Asia is the third largest HMI software market in the world. The Asia revenue share of the HMI software market rose from 16.7 percent of the worldwide HMI software market in 2005 to 18.1 percent in 2007. More manufacturers are expanding their operations in China due to lower labor

China will continue to drive global growth in the automation and manufacturing marketplace for the foreseeable future. For future growth to be stable, however, it must also be controlled to avoid overheating and overexpansion. costs, improving quality of education, and easing governmental policies for foreign direct investments (FDI). Additionally, increasing demand from an expanding middle class for a variety of products is driving more investments for automation in a wider range of industries to increase the productivity and quality required for the global market.

The automation market benefits from an increasing investments' upsurge in industries, such as Automotive, Oil & Gas, Power Generation, and other infrastructure industries. Additionally, older manufacturing operations need to improve their performance and quality of products as well as their overall equipment effectiveness (OEE). The drive toward higher quality standards and regulatory compliance in China, and the creation of worldclass food and beverage, pharmaceutical, and consumer products companies, is a national priority for China, especially in the wake of product safety concerns that have affected the China market in the past. There is much room for improvement as China consolidates these industries and adopts more sophisticated levels of automation. Easing US consumer spending may not have a very significant impact on China's economy, but will drive the growth to a moderate level. However, China still presents unparalleled growth opportunities for both automation suppliers and global manufacturers.

#### India

The core manufacturing sector in India comprises engineering and construction, industrial manufacturing, materials and commodities, chemicals and plastics, and automotive. While India experienced a slowdown in the manufacturing sector during the last half of 2007, moderate growth is expected to continue. The slowdown in the manufacturing sector's growth was specifically in machinery and equipment, basic metal and alloy industries, rubber, plastic, petroleum and coal products, cotton textiles, nonmetallic mineral products, and transport equipment and parts, among others. India's future growth, however, remains strong, supported by domestic demand. India's bright economic prospects have driven inflows, which in turn have given rise to rupee appreciation and excess liquidity. More capital is available for investments. Additionally, more machinery and equipment are being imported for manufacturing, because currency appreciation has made the cost of machinery and automation equipment relatively lower. Investments in infrastructure are essential. Overall, prospects for India's growth and macroeconomic stability remain good, and a higher growth path could be achieved by accelerating key reforms.

More machinery and equipment are being imported for manufacturing because currency appreciation has made the cost of machinery and automation equipment relatively lower. While a booming economy where inflation is under control promises well for an Indian manufacturing sector, India has some way to go to reach a state of stability similar to other western countries. The industrial growth rate in India is expected to be in the double digits, driven by the growth of the manufac-

turing sector. Mergers and acquisitions are also taking place at a high rate for a variety of reasons, such as to expand market reach, gain new capabilities, improve market position, lower costs, and gain access to low-cost raw materials sources.

## <u>Japan</u>

Economic growth in Japan is stalling with unstable global financial markets and the weak dollar undercutting exporters' earnings when converting back to yen. Higher crude-oil and commodity prices also put Japanese firms in a tight spot as rising costs drag down corporate profits. Automation suppliers experienced lower sales in Japan due to the negative impacts of a slowdown in capital investment for the Semiconductor, FPD, and Electronic Components industries.

Japan is lowering its assessment of their economy in the wake of deepening turmoil in financial markets and worries over the global economic outlook. While a moderate recovery trend was still in place, Japan may follow the United States into a possible recession as volatile markets and rising raw materials costs hurt corporate activity, a key driver of growth. Lower capital investments in the FPD manufacturing for Asia in 2007 have significantly hindered growth for many Japanese suppliers.

#### **Latin America**

Latin America is the smallest regional HMI software market in the world. The Latin America revenue share of the HMI software market fell slightly from 4.8 percent of the worldwide HMI software market in 2005 to 4.0 percent in 2007. Latin American industrial production grew by 4.3 percent in 2006, but the final figures from 2007 showed a moderate slowdown to 3.9 percent. Brazil showed stronger growth in the first half of 2007. The close coupling of the US and Mexican economies resulted in a slowdown in Mexico for the same period. The three largest economies, Brazil, Argentina, and Mexico are responsible for more than 80 percent of the region's manufacturing output.

The three largest economies, Brazil, Argentina, and Mexico are responsible for more than 80 percent of the region's manufacturing output. Stronger growth in Brazil is fueled by improved credit conditions, rising internal demand, and strong export activity that remains resilient in the face of continued currency appreciation. In addition to a weak peso, the unrelenting growth of domestic demand is helping

Argentina. However, a weaker US economy would dampen demand for Latin American exports, with Mexico and Central America being most at risk because of greater trade linkages. Prospects will continue to remain brighter for Brazil and Argentina. Integrated steel companies, particularly in Brazil, enjoy two clear advantages: access to an abundance of high quality local iron ore, and a domestic market with little local competition and above-average prices.

Growing global demand for metals, particularly by China, has kindled intense interest in South America's mineral wealth. Yet some global mining houses, concerned primarily about political risk and macroeconomic volatility, remain too wary of further investments in the region. What's more, the macroeconomic situation of most South American countries has stabilized, so hyperinflation, excessive external debt, default, and rapid currency devaluations are all less likely in the future. Countries, such as Chile, can be regarded as mature mining regions, and investors find many attractive growth opportunities there and elsewhere in South America, typically in greenfield investments rather than through acquisitions of existing assets. Except for countries, such as Bolivia and Venezuela, which are hostile to foreign investment, most of Latin America welcomes multinationals, imposing few restrictions on foreign companies and reasonably low royalty and tax rates.

# **A Note Regarding Currency Fluctuations**

We are confronted with a phenomenon that we have not seen since 2004, a large fluctuation between the world's two main currencies. The sudden decline in the value of the US dollar vs. the euro from 2006 to 2007 causes a significant jump in dollar revenue for the European region suppliers and market.

From 2004 to 2006, the dollar/euro exchange rate remained nearly constant in terms of the annual average rate (average of 365 daily rates). In 2007, however, the dollar's sudden decline resulted in the euro gaining significantly over the dollar. In 2008, this trend may continue.

## Effect on EMEA growth

All suppliers that do business in Euro countries (or countries whose currency is tied to the Euro) will have additional growth in 2007 on top of organic growth.

#### Effect on worldwide growth

The effect on total global growth will depend on each supplier's relative exposure to Euro countries (the portion of business done in these countries). In terms of market share measured in dollars, this will cause a supplier with higher percent of Euro region business to gain market share and a supplier with lesser participation will not have a favorable outcome in terms of market share.

## Comparing market size and market shares from different years

Please note that ARC studies only look at markets in dollars. When comparing ARC reports data from different years, readers must take into account the ongoing changes in exchange rates that occur from year to year and use the exchange rates given in each study to convert back to local currencies. Please note that each ARC report issues a table for exchange rates for major currencies used in the base year.

# Leading Suppliers of Human Machine Interface Software



2007 = 926.1 Million US Dollars

Other = 8.9 %

Leading Suppliers of Human Machine Interface Software for North America



2007 = 341.1 Million US Dollars

Other = 3.1 %

# Leading Suppliers of Human Machine Interface Software for EMEA



2007 = 380.4 Million US Dollars

Other = 6.7 %

# Leading Suppliers of Human Machine Interface Software for Asia



2007 = 167.8 Million US Dollars

Other = 5.8 %

# Leading Suppliers of Human Machine Interface Software for Latin America



2007 = 36.8 Million US Dollars

Other = 7.9 %

# Chapter 4 Market Analysis and Forecast

The HMI Software market is in a period of relatively strong growth with an expected compound annual growth rate (CAGR) of 9.1 percent over the next five years. The services' market growth is expected to be stronger than

HMI Software Market						
Total 2007 Shipments (Millions of Dollars)	\$926.1					
CAGR (2007-2012)	9.1%					

the total market growth with a CAGR of 13.5 percent over five years. The market for service and support will increase as a result of the end users' and OEMs' growing needs for technical support as they no longer have the internal personnel to provide it.

ARC predicts that the Asia Pacific and Latin American HMI software markets will be the fastest growing areas at 14.6 percent and 13.6 percent CAGR respectively. North America and EMEA will be growing at a considerably slower rate of 6.7 percent and 7.9 percent CAGR respectively, a slowdown from the period of 2005 to 2007 when those regions experienced growth of 17.1 percent and a 20.5 percent CAGR respectively. ARC believes that a significant amount of HMI software adoption has taken place in these mature markets over the last two years, especially in the Automotive industry, which is projected to fall from 10.1 percent of all HMI software sales in 2007 to 8.7 percent of all HMI software sales in 2012.

# **Segmentation and Forecasts**

This chapter quantifies, analyzes, and forecasts the worldwide market for HMI and related software and services. Base year 2007 market size and forecasts for the total marketplace and each segment are presented in this chapter. In addition to current and forecast shipments of HMI and related software, the following segmentations are included:

- HMI and Related Software/Services Revenues by World Region
- HMI and Related Software/Services Revenues for China, Japan, and Rest of Asia
- HMI and Related Revenues by Software versus Services
- HMI and Related Software/Services Revenues by Industry
- HMI and Related Software Revenues by Operating System
- HMI and Related Software Units by Operating System
- HMI and Related Software/Services Revenues by Sales Channel
- HMI and Related Software/Services Revenues by Customer Type

Total worldwide revenues from HMI and related software, including revenues from associated software and services, rose to roughly \$926.1 million in 2007. With a compound annual growth rate of 9.1 percent over the next five years, the market is expected to reach \$1,430.5 million by the end of 2012. Data on market size and segmentations were derived from ARC's extensive inhouse database and in-depth interviews with the leading suppliers of HMI and related software to the worldwide marketplace. Forecasts were generated from a combination of end user interviews, trends in demand for different types of automation

equipment, and ARC's assessment of the potential for growth in each segment of the automation marketplace. All dollar forecasts are in current US dollars and are based on an inflation rate of three percent per year.

# **Total HMI and Related Software Business Including Services**

Total worldwide revenues from HMI and related software, including revenues from associated software and services, rose to roughly \$926.1 million in 2007. With a compound annual growth rate of 9.1 percent over the next five years, the market is expected to reach \$1,430.5 million by end of 2012.

HMI software continues to replace proprietary software that is embedded in devices, such as operator interface terminals. This CE-based HMI Software is also being increasingly deployed on numerous types of wireless devices, such as PDAs, tablet PCs, and mobile phones, also replacing proprietary solutions. This has led Windows CE to be the HMI Software operating system in over 23 percent of the units sold in 2007, up from over 18 percent of the units sold in 2005, and projected to grow to grow to almost 29 percent of the units sold in 2012. In addition, growth is taking place at a fast rate in the rapidly growing process industries, such as Oil & Gas and Water & Wastewater. HMI software is projected to rise from 7.6 percent and 8.2 percent respectively of all Oil & Gas and Water & Wastewater HMI software sales in 2007, to 8.6 percent and 9.1 percent respectively of all HMI software sales in 2012. HMI Software is penetrating deeper and deeper into these process applications and stretching across the entire enterprise.

Operating systems classified as "other" or "remainder" are projected to grow at a revenue rate of 9.3 percent, versus 7.7 percent for the overall HMI software market. These operating systems are predominantly Microsoft Server 2003 today, and will shift to mostly Server 2008 by end of 2012.

## **Factors Contributing to Growth**

# Greater Use of PACs with HMI Software in Process Applications

PLC-based Programmable Automation Controllers (PACs) and DCS-based PACs are being deployed at an increasing rate in the process industries, and each of these PACs requires HMI software to best leverage their capabilities. ARC estimates that the Food & Beverage industry, the largest HMI software vertical, is also the largest users of PACs, with growth driven by the extensive installed base of PLCs in those industries and the natural evolution to the multidiscipline functionality needed for logic, motion, and process in Food & Beverage manufacturing. However, the Oil & Gas, Mining & Metals, Electric Power, and Water & Wastewater industries are projected to be the fastest growing users of PACs over the next five years. The growth drivers for those industries are primarily the global product demand for energy and natural resources, and increased capital spending to support that demand. These four industries are projected to also be the fastest growing HMI software verticals.

Greater Use of PACs with HMI Software in Process Applications
Sustainable Manufacturing

Increased Operational Visualization Information Agility

Leveraging Dynamic OEE

Maximizing Visualization Capabilities by Leveraging Technology

#### **Factors Contributing to Growth**

PACs are multi-disciplined controllers capable of providing real-time logic, motion, and process control, in addition to HMI software and other functions, on a single platform. End users and OEMs can deploy multiple control applications on this single platform, using common development tools that are both flexible and

configurable for design and integration. PACs, used in conjunction with HMI software, facilitate a highly distributed automated factory environment and employ standard network interfaces and programming languages, thereby allowing for data exchange as part of a plant floor network of multi-vendor systems. Multi-functional controller platforms, such as PACs, help facilitate the move to more open modular control architectures and serve as an interface for standards-based device, motion, and control networks. The result is connected manufacturing processes to business systems as part of a Collaborative Manufacturing Management (CMM) model that provides a template for organizing and controlling the key business processes of a manufacturing enterprise. In a perfect world, a PAC would be an automation system with all the components for control-ling and automating machines, production lines, and entire factories. All

parts of the system are designed to maximize software and hardware integration. There is one programming and engineering tool, as well as one programming language, and a single tag database for the complete system. There is transparent access of all parameters and functions of the whole system, along with a maximum integration level to the enterprise, though the use of Intranet, Internet and IT-standards.

#### **Sustainable Manufacturing**

The generally recognized definition of "sustainable" is development that meets the needs of the present without compromising the needs of future generations. Sustainable manufacturing is a positive business approach that has to do with delivering economic benefits while simultaneously being a responsible member of the community as it focuses on initiatives that are designed to minimize their environmental impact.

The Food & Beverage manufacturing industry, the largest HMI software vertical, is one of the largest consumers of energy and water, and one of the largest producers of water and land environmental waste product. Businesses are now focusing on sustainable manufacturing initiatives to drive new growth and margin while responding to new retailer, regulatory, and "green" demands. For example, the Food & Beverage industry, the largest HMI software vertical, is one of the largest consumers of energy and water, and one of the largest producers of water and land environmental waste product. As manufacturers continue to expand into India,

China, and other parts of the less industrialized world, manufacturing and supply chain operations must use technologies to adjust their operations to even more limited water and other resources. Automation equipment, including PLC-based PACs equipped with HMI software, play an important role in these initiatives as they help satisfy many "green" demands, including the visualization and control of AC drives, which saves significant energy. The challenge of creating a low-carbon society will require a revolution. Manufacturers must adapt their manufacturing and supply chain processes to these more limited resources, and are expected to bring these new technologies back to their operations, which will continue to drive HMI software growth.

#### **Increased Operational Visualization Information Agility**

Manufacturers are increasing their operational visualization information agility by accessing and visualizing real-time information and applying it to speed up and improve operations integrating business, manufacturing, and production. This focus is on continuous performance and agility improvement, visualization and control of production equipment, digitized manufacturing operations, and unified and standardized plant IT infrastructure. These manufacturers are deploying information technology that serves their business and operations needs and is based on industry standards, securely managing and standardizing visualization and IT infrastructure across multiple facilities. This standardization of visualization is a driving force in the growth of HMI software. These manufacturers seek greater IT,

Manufacturers are also placing a higher value on visualization of the in-formation provided by the asset, rather than the asset itself. That leads to challenges, which lie with choosing what HMI software and information platforms to adopt that will keep those manufacturers globally competitive. engineering time, and cost savings by implementing visualization applications that leverage quicker to deploy graphics capabilities that can be rapidly implemented and managed. Manufacturers want to take the pain out of expanding and managing disparate systems by transforming their HMI softwarebased operator interfaces into enterprise-wide, collaboration tools without disrupting their current operations.

Manufacturers are also placing a higher value on visualization of the information provided by the asset, rather than the asset itself. That leads to challenges, which lie with choosing what HMI software and information platforms to adopt that will keep those manufacturers globally competitive. This has created a strong focus on what to do with data provided by assets and how data gets converted into the information needed to manage their business. HMI Software is playing a key role in the way an asset's information is viewed and analyzed. HMI software is enabling the proliferation of, for example, asset management and condition monitoring applications, which are critically important as manufacturers look to minimize the lifecycle costs of their capital assets.

## Leveraging Dynamic OEE

HMI Software is used as digital dashboards to show Key Performance Indicators (KPIs) for the entire enterprise, such as throughput or downtime, and generates reports of actual performance versus targets. HMI Software that leverages Dynamic Overall Equipment Effectiveness (OEE) analysis and reporting tools is used to identify typical problem types, when and where they occur, and what impact they have on overall OEE. HMI Software that leverages Dynamic OEE provides a view and a record of the availability, performance, and quality factors per order, per product, per shift, or for other specific metrics. HMI Software helps production management make essential operating de-



cisions to increase plant performance based on the Dynamic OEE information that it gathers, stores, and displays. For example, this information helps manufacturers optimize maintenance schedules that account for maximum economic performance of equipment rather than solely depending upon attempts to predict and avoid failures, thus plant performance is optimized. On the plant floor, this information also provides line operators and team leaders with actionable data in real-time to help them make better decisions.

Dynamic OEE has moved traditional OEE from a historical reporting metric to an on-line, real-time performance indicator. Dynamic OEE helps determine what impact the current performance of any individual piece of equipment has on the overall efficiency of the plant. This is also where HMI Software comes into play. Rather than having multiple Dynamic OEE calculations done at the machine level, HMI Software provides the interoperability and connectivity required to gather, archive, and display Dynamic OEE information enterprise-wide.

# Maximizing Visualization Capabilities by Leveraging Technology

Effective HMI software visualization must be adapted to the operator's needs while incorporating the manufacturing process requirements for optimal operation. The HMI software must focus attention on the process as a whole and avoid distraction when, for example, zooming into details. An effective HMI software visualization reminds the operator as much as possible of the real process, and avoids the need to translate their thinking into code, numbers and tags. Operations improve when the operator is able to solve complex problems, which results in increasing KPIs and Operational Excellence.

Overall operational performance is affected by maximizing the visualization of the HMI software through leveraging the latest in technology, such as 64-bit computing, and deploying an operating system designed to optimize this hardware, such as Microsoft Vista or Server 2008. Best results for the operator are obtained from presenting the most realistic representations of the process possible, developed through a collaborative design and implementation process between operators, process or design engineering, and operations management. Time and budget spent on this improved process visualization pays off very quickly in terms of operational improvement, reduced incidents and accidents, operator turnover, and absenteeism.

# **Factors Inhibiting Growth**

#### **HMI Software Units Growing Faster Than Revenue**

Reduced HMI software unit costs are driving significant unit volume growth, forecasted at 11.4 percent CAGR from 2007 through 2012, with a slower revenue growth forecasted at 9.1 percent CAGR from 2007 through 2012. This is a difficult trend for HMI software suppliers as support requirements grow with the unit volumes, not revenue. This will challenge HMI software suppliers to provide new lower cost support mechanisms.

HMI Software Units Growing Faster Than Revenue

Economic Slowdown Due To Inflation and Escalating Energy Costs

Pirated Software Dilutes HMI Software Revenue Potential

Insufficient Tools and Support for Operating System Migration

Exchange Rates Negatively Affecting Growth

#### **Factors Inhibiting Growth**

The growth of Windows CE as a HMI software operating system is also behind this trend, growing from over 23 percent of the units sold in 2007 to almost 29 percent of the units sold in 2012. Windows CE has established a significant niche as an operating system ranging from low cost specialized hardware platforms to small footprint flat screen applications. Single small

footprint, CE-based devices are able to provide both HMI and control, eliminating the need to run display and control on separate devices. HMI software suppliers initially saw Windows CE as an opportunity in the lowend embedded OIT market, but CE-based HMI software emerged running on a range of form factors from handhelds to function rich applications. Overall, CE-based HMI software will remain one of the most solid unit growth areas in the HMI software market, thereby weighting down revenue growth.

# Economic Slowdown Due To Inflation and Escalating Energy Costs

Rapidly rising demand for commodities, soaring costs of energy, and growing oil demand are driving up prices for most basic goods as well as fanning inflation fears. The fallout from a combination of rising inflation and a slowdown in major economies, such as the US, can bring 'stagflation', causing serious deterioration in the global economy. Economists have concerns ranging from high oil prices, to record trade deficits in developed

If crude oil prices continue to rise from their already record high levels, manufacturers may try to hold back capital expenditures, thereby impacting the HMI software market growth. countries, to terrorist attacks, to natural disasters, such as hurricanes, cyclones, earthquakes, and tsunamis that could swiftly change the HMI software market outlook. If crude oil prices continue to keep surpassing their record high levels, manufacturers may try to hold back capital expenditures, thereby impacting the HMI software market

growth. Crude oil prices are already putting a damper on economic growth. High oil prices affect manufacturing industries by driving up costs of raw materials and energy, while cutting into profits. This can result in manufacturers having to lower their production output and having to raise their product prices to the market. At the same time, lower consumer incomes squeeze individual spending and reduce demand for the manufacturer's products and services.

#### **Pirated Software Dilutes HMI Software Revenue Potential**

Despite efforts to crackdown on pirated software through organizations, such as the Business Software Alliance, there continues to be a large black market where unlicensed copies of HMI software are sold, sometimes through online sources and spam, as well as some established sales channels, such as eBay. In addition, the fastest growing regions for HMI software are also the regions with the highest rates of piracy. If these fast growing regions are able to effectively cut down on sales of illegal HMI software, then the forecasted HMI software market within those regions could grow at even faster rates than predicted. ARC market forecasts are adjusted downward regionally to reflect the fact that pirated software exists and is a growth hindrance in every market.

#### **Insufficient Tools and Support for Operating System Migration**

Manufacturers who have the desire to upgrade their HMI software to the latest operating system sometimes resist, because they feel that there are not sufficient tools to assist them in pain-free operating system and HMI software migration. The fear of delays that could possibly have an adverse effect on production outweighs the potential business benefits of the latest operating system, according to many manufacturers. In addition, manufacturers also fear potential problems that could be created by the release of patches and system service packs for the newest operating systems. These manufacturers fear that these patches and service packs can potentially have adverse effects on productivity and the total cost of ownership.

## **Exchange Rates Negatively Affecting Growth**

The exchange rate continues to play havoc in the HMI software market. In the US in the short term, a weak dollar makes US goods cheaper on world

Manufacturers who have the desire to upgrade their HMI software to the latest operating system sometimes resist, because they feel that there are not sufficient tools to assist them in pain-free operating system and HMI software migration. markets, which should boost US growth and employment. This also makes imported goods more expensive and can increase the ever increasing US trade deficit. However, more and more economists warn that America's growing budget deficit, combined with its trade deficit, will lead to a crisis in which the dollar falls much more sharply, driving up interest rates and squeezing the economy.

The declining dollar over the past two years has made an impact on the HMI software market size. It affects the competitiveness of European suppliers in markets outside of Europe. The stabilization of exchange rates is likely to reduce the inhibition to market growth in the near term, but currencies in developing regions may appreciate in the long term and inhibit market growth in those regions as well.

We have also included the following note in chapter 3.

# A Note Regarding Currency Fluctuations

We are confronted with a phenomenon that we have not seen since 2004, a large fluctuation between the world's two main currencies. The sudden decline in the value of the US dollar vs. the euro from 2006 to 2007 causes a significant jump in dollar revenue for the European region suppliers and market.

From 2004 to 2006, the dollar/euro exchange rate remained nearly constant in terms of the annual average rate (average of 365 daily rates). In 2007, however, the dollar's sudden decline resulted in the euro gaining significantly over the dollar. In 2008, this trend may continue.

#### **Effect on EMEA growth**

All suppliers that do business in Euro countries (or countries whose currency is tied to the Euro) will have additional growth in 2007 on top of organic growth.

#### Effect on worldwide growth

The effect on total global growth will depend on each supplier's relative exposure to Euro countries (the portion of business done in these countries). In terms of market share measured in dollars, this will cause a supplier with higher percent of Euro region business to gain market share and a supplier with lesser participation will not have a favorable outcome in terms of market share.

#### Comparing market size and market shares from different years

Please note that ARC studies only look at markets in dollars. When comparing ARC reports data from different years, readers must take into account the ongoing changes in exchange rates that occur from year to year and use the exchange rates given in each study to convert back to local currencies. Please note that each ARC report issues a table for exchange rates for major currencies used in the base year.

Total Shipments of Human Machine Interface Software

Figures in Millions of US Dollars, Total Market CAGR = 9.1%



Total Shipments of Human Machine Interface Software for Software Revenues



Figures in Millions of US Dollars, Total Market CAGR = 7.7%

Total Shipments of Human Machine Interface Software for Service Revenues



Figures in Millions of US Dollars, Total Market CAGR = 13.5%

# Total Shipments of Human Machine Interface Software by Revenue Category

# Figures in Millions of US Dollars

Revenue Category	2007	2008	2009	2010	2011	2012	CAGR
Software Revenues	726.0	769.6	825.8	890.2	962.3	1,053.7	7.7%
Service Revenues	200.1	229.1	260.9	296.2	334.9	376.8	13.5%
Total	926.1	998.7	1,086.7	1,186.3	1,297.2	1,430.5	9.1%
# Total Shipments of Human Machine Interface Software for Software Revenues By Type

	2007	2008	2009	2010	2011	2012	CAGR
Human Machine Interface	296.6	306.7	321.4	338.4	356.4	380.2	5.1%
Control & Programing	117.4	124.6	133.9	144.5	156.4	171.4	7.9%
Supervisory	239.5	261.8	289.5	321.7	359.0	406.0	11.1%
Other Software Types	72.5	76.5	80.9	85.6	90.6	96.1	5.8%
Total	726.0	769.6	825.8	890.2	962.3	1,053.7	7.7%

Total Shipments of Human Machine Interface Software for Software Revenues by Operating System

	2007	2008	2009	2010	2011	2012	CAGR
Remainder	59.9	65.1	71.0	78.0	85.2	93.3	9.3%
Windows CE	66.0	70.7	76.4	83.4	92.0	102.5	9.2%
Windows NT / 2000	138.4	116.3	89.5	63.6	44.5	31.1	-25.8%
Windows XP	431.9	470.8	508.4	518.6	463.1	289.5	-7.7%
Legacy Windows	1.3	1.2	0.9	0.6	0.3	0.2	-35.2%
Windows Vista	14.7	29.5	58.9	117.8	235.4	470.5	99.9%
Linux	0.7	0.8	1.2	1.9	3.4	6.8	57.4%
Terminal Services	10.7	12.9	16.7	23.4	35.1	56.2	39.3%
VxWorks	0.2	0.3	0.3	0.3	0.3	0.4	8.4%
Java	2.1	2.2	2.4	2.6	2.9	3.2	9.5%
Total	726.0	769.6	825.8	890.2	962.3	1,053.7	7.7%

# Total Shipments of Human Machine Interface Software by Revenue Category

Revenue Category	2007 Revenues	2007 Revenues%	2012 Revenues	2012 Revenues%	CAGR
Software Revenues	726.0	78.4%	1,053.7	73.7%	7.7%
Service Revenues	200.1	21.6%	376.8	26.3%	13.5%
Total	926.1	100.0%	1,430.5	100.0%	9.1%

# Total Shipments of Human Machine Interface Software for Software Revenues By Type

	2007 Revenues	2007 Revenues%	2012 Revenues	2012 Revenues%	CAGR
Human Machine Interface	296.6	40.9%	380.2	36.1%	5.1%
Control & Programing	117.4	16.2%	171.4	16.3%	7.9%
Supervisory	239.5	33.0%	406.0	38.5%	11.1%
Other Software Types	72.5	10.0%	96.1	9.1%	5.8%
Total	726.0	100.0%	1,053.7	100.0%	7.7%

Total Shipments of Human Machine Interface Software for Software Revenues by Operating System

	2007 Revenues	2007 Revenues%	2012 Revenues	2012 Revenues%	CAGR
Remainder	59.9	8.2%	93.3	8.9%	9.3%
Windows CE	66.0	9.1%	102.5	9.7%	9.2%
Windows NT / 2000	138.4	19.1%	31.1	3.0%	-25.8%
Windows XP	431.9	59.5%	289.5	27.5%	-7.7%
Legacy Windows	1.3	0.2%	0.2	0.0%	-35.2%
Windows Vista	14.7	2.0%	470.5	44.7%	99.9%
Linux	0.7	0.1%	6.8	0.6%	57.4%
Terminal Services	10.7	1.5%	56.2	5.3%	39.3%
VxWorks	0.2	0.0%	0.4	0.0%	8.4%
Java	2.1	0.3%	3.2	0.3%	9.5%
Total	726.0	100.0%	1,053.7	100.0%	7.7%

Total Shipments of Human Machine Interface Software by Revenue Category

2007 = 926.1 Millions of US Dollars



2012 = 1,430.5 Millions of US Dollars



Total Shipments of Human Machine Interface Software for North America



Figures in Millions of US Dollars, Total Market CAGR = 6.7%

Total Shipments of Human Machine Interface Software for EMEA

600 556.8 510.8 472.5 437.5 406.2 Millions of US Dollars 400-380.4 200 0 2007 2008 2009 2010 2011 2012 Year

Figures in Millions of US Dollars, Total Market CAGR = 7.9%

Total Shipments of Human Machine Interface Software for Asia

Figures in Millions of US Dollars, Total Market CAGR = 14.6%



Total Shipments of Human Machine Interface Software for Latin America



Figures in Millions of US Dollars, Total Market CAGR = 13.6%

# Total Shipments of Human Machine Interface Software by World Region

World Region	2007	2008	2009	2010	2011	2012	CAGR
North America	341.1	360.2	383.6	409.7	438.0	472.1	6.7%
EMEA	380.4	406.2	437.5	472.5	510.8	556.8	7.9%
Asia	167.8	190.5	217.9	249.9	286.9	331.9	14.6%
Latin America	36.8	41.8	47.7	54.2	61.6	69.7	13.6%
Total	926.1	998.7	1,086.7	1,186.3	1,297.2	1,430.5	9.1%

# Total Shipments of Human Machine Interface Software for Asia by Country

	2007	2008	2009	2010	2011	2012	CAGR
Japan	18.1	18.8	19.6	20.4	22.0	23.9	5.8%
Rest of Asia	99.3	114.1	132.3	153.6	177.6	207.2	15.8%
China	50.4	57.5	66.0	75.8	87.2	100.8	14.9%
Total	167.8	190.5	217.9	249.9	286.9	331.9	14.6%

# Total Shipments of Human Machine Interface Software by World Region

World Region	2007 Revenues	2007 Revenues%	2012 Revenues	2012 Revenues%	CAGR
North America	341.1	36.8%	472.1	33.0%	6.7%
EMEA	380.4	41.1%	556.8	38.9%	7.9%
Asia	167.8	18.1%	331.9	23.2%	14.6%
Latin America	36.8	4.0%	69.7	4.9%	13.6%
Total	926.1	100.0%	1,430.5	100.0%	9.1%

# Total Shipments of Human Machine Interface Software for Asia by Country

	2007 Revenues	2007 Revenues%	2012 Revenues	2012 Revenues%	CAGR
Japan	18.1	10.8%	23.9	7.2%	5.8%
Rest of Asia	99.3	59.2%	207.2	62.4%	15.8%
China	50.4	30.1%	100.8	30.4%	14.9%
Total	167.8	100.0%	331.9	100.0%	14.6%

Total Shipments of Human Machine Interface Software by World Region



2007 = 926.1 Millions of US Dollars

Total Shipments of Human Machine Interface Software for Asia by Country





2012 = 331.9 Millions of US Dollars



# Total Shipments of Human Machine Interface Software by Industry

Industry	2007	2008	2009	2010	2011	2012	CAGR
Chemical	59.4	64.9	71.6	79.1	87.4	97.5	10.4%
Refining	0.3	0.3	0.3	0.4	0.4	0.4	10.5%
Oil & Gas	70.2	77.8	87.0	97.5	109.4	123.7	12.0%
Food & Beverage	130.8	142.2	155.8	171.3	188.4	208.9	9.8%
Pharmaceutical & Biotech	55.7	59.7	64.5	69.9	75.9	83.0	8.3%
Pulp & Paper	39.3	41.4	43.9	46.7	49.7	53.4	6.3%
Mining & Metals	61.8	68.3	76.2	85.2	95.3	107.0	11.6%
Electric Power	56.0	61.7	68.6	76.5	85.4	96.1	11.4%
Water & Wastewater	76.4	84.1	93.4	103.9	115.8	130.0	11.2%
Cement & Glass	23.1	24.4	25.9	27.6	29.4	31.6	6.4%
Automotive	93.4	97.8	103.3	109.4	116.0	124.0	5.8%
Aerospace & Defense	16.1	16.8	17.6	18.5	19.4	20.6	5.0%
Machinery	50.5	54.9	60.3	66.3	73.0	81.0	9.9%
Fabricated Metals	19.8	21.6	23.7	26.2	28.9	32.2	10.2%
Medical Products	1.1	1.2	1.3	1.4	1.5	1.6	6.9%
Electrical	40.1	43.3	47.1	51.4	56.1	61.8	9.0%
Semiconductors	26.0	27.5	29.2	31.2	33.4	36.0	6.7%
Building Automation	11.6	12.3	13.2	14.2	15.2	16.5	7.2%
Household & Personal Care	3.6	3.8	4.1	4.5	4.8	5.2	7.8%
Other	90.9	94.7	99.7	105.4	111.9	120.0	5.7%
Total	926.1	998.7	1,086.7	1,186.3	1,297.2	1,430.5	9.1%

# Total Shipments of Human Machine Interface Software by Industry

Industry	2007 Revenues	2007 Revenues%	2012 Revenues	2012 Revenues%	CAGR
Chemical	59.4	6.4%	97.5	6.8%	10.4%
Refining	0.3	0.0%	0.4	0.0%	10.5%
Oil & Gas	70.2	7.6%	123.7	8.6%	12.0%
Food & Beverage	130.8	14.1%	208.9	14.6%	9.8%
Pharmaceutical & Biotech	55.7	6.0%	83.0	5.8%	8.3%
Pulp & Paper	39.3	4.2%	53.4	3.7%	6.3%
Mining & Metals	61.8	6.7%	107.0	7.5%	11.6%
Electric Power	56.0	6.0%	96.1	6.7%	11.4%
Water & Wastewater	76.4	8.2%	130.0	9.1%	11.2%
Cement & Glass	23.1	2.5%	31.6	2.2%	6.4%
Automotive	93.4	10.1%	124.0	8.7%	5.8%
Aerospace & Defense	16.1	1.7%	20.6	1.4%	5.0%
Machinery	50.5	5.5%	81.0	5.7%	9.9%
Fabricated Metals	19.8	2.1%	32.2	2.2%	10.2%
Medical Products	1.1	0.1%	1.6	0.1%	6.9%
Electrical	40.1	4.3%	61.8	4.3%	9.0%
Semiconductors	26.0	2.8%	36.0	2.5%	6.7%
Building Automation	11.6	1.3%	16.5	1.2%	7.2%
Household & Personal Care	3.6	0.4%	5.2	0.4%	7.8%
Other	90.9	9.8%	120.0	8.4%	5.7%
Total	926.1	100.0%	1,430.5	100.0%	9.1%

Total Shipments of Human Machine Interface Software by Industry



2007 = 926.1 Millions of US Dollars

2012 = 1,430.5 Millions of US Dollars





# Total Shipments of Human Machine Interface Software by Sales Channel

Sales Channel	2007	2008	2009	2010	2011	2012	CAGR
Direct Sales	241.8	261.4	285.0	311.5	340.7	375.8	9.2%
Independent Reps/Distributors	465.2	494.5	530.1	569.9	613.2	665.3	7.4%
Internet	75.1	84.1	95.4	108.6	124.4	143.3	13.8%
Systems Integrators/Value Added Resellers	144.0	158.7	176.3	196.4	219.0	246.1	11.3%
Total	926.1	998.7	1,086.7	1,186.3	1,297.2	1,430.5	9.1%

# Total Shipments of Human Machine Interface Software by Sales Channel

Sales Channel	2007 Revenues	2007 Revenues%	2012 Revenues	2012 Revenues%	CAGR
Direct Sales	241.8	26.1%	375.8	26.3%	9.2%
Independent Reps/Distributors	465.2	50.2%	665.3	46.5%	7.4%
Internet	75.1	8.1%	143.3	10.0%	13.8%
Systems Integrators/Value Added Resellers	144.0	15.5%	246.1	17.2%	11.3%
Total	926.1	100.0%	1,430.5	100.0%	9.1%

Total Shipments of Human Machine Interface Software by Sales Channel





2012 = 1,430.5 Millions of US Dollars



# Total Shipments of Human Machine Interface Software by Customer Type

Customer Type	2007	2008	2009	2010	2011	2012	CAGR
End Users	482.5	516.0	556.2	600.0	647.5	700.8	7.8%
Original Equipment Manufacturers	209.6	227.7	249.7	275.5	304.7	341.5	10.3%
Systems Integrators	234.0	255.0	280.8	310.8	345.0	388.2	10.7%
Total	926.1	998.7	1,086.7	1,186.3	1,297.2	1,430.5	9.1%

## Total Shipments of Human Machine Interface Software by Customer Type

Customer Type	2007 Revenues	2007 Revenues%	2012 Revenues	2012 Revenues%	CAGR
End Users	482.5	52.1%	700.8	49.0%	7.8%
Original Equipment	209.6	22.6%	341.5	23.9%	10.3%
Systems Integrators	234.0	25.3%	388.2	27.1%	10.7%
Total	926.1	100.0%	1,430.5	100.0%	9.1%

Total Shipments of Human Machine Interface Software by Customer Type



2007 = 926.1 Millions of US Dollars

# Total Shipments of Human Machine Interface Software by Operating System

Operating System	2007	2008	2009	2010	2011	2012	CAGR
Linux	1.8	2.1	3.0	4.8	8.7	17.4	57.9%
Terminal Services	7.6	9.2	12.3	17.7	27.4	45.4	43.2%
VxWorks	0.1	0.1	0.1	0.1	0.1	0.1	10.3%
Java	4.1	4.4	4.7	5.2	5.7	6.5	9.6%
Windows CE	111.4	127.1	146.5	170.4	200.0	237.0	16.3%
Windows NT / 2000	64.3	53.4	40.6	28.8	19.9	13.7	-26.6%
Windows XP	225.9	243.9	261.0	263.6	232.8	143.2	-8.7%
Legacy Windows	3.3	3.0	2.4	1.7	1.0	0.5	-31.5%
Windows Vista	9.0	17.9	35.6	70.7	140.6	279.6	98.8%
Other	52.9	57.1	61.9	67.4	73.0	79.1	8.4%
Total	480.4	518.3	568.0	630.4	709.1	822.5	11.4%

### Figures in Thousands of Units

# Total Shipments of Human Machine Interface Software by Operating System

Operating System	2007 Units	2007 Units%	2012 Units	2012 Units%	CAGR
Linux	1.8	0.4%	17.4	2.1%	57.9%
Terminal Services	7.6	1.6%	45.4	5.5%	43.2%
VxWorks	0.1	0.0%	0.1	0.0%	10.3%
Java	4.1	0.9%	6.5	0.8%	9.6%
Windows CE	111.4	23.2%	237.0	28.8%	16.3%
Windows NT / 2000	64.3	13.4%	13.7	1.7%	-26.6%
Windows XP	225.9	47.0%	143.2	17.4%	-8.7%
Legacy Windows	3.3	0.7%	0.5	0.1%	-31.5%
Windows Vista	9.0	1.9%	279.6	34.0%	98.8%
Other	52.9	11.0%	79.1	9.6%	8.4%
Total	480.4	100.0%	822.5	100.0%	11.4%

### Figures in Thousands of Units

### Total Shipments of Human Machine Interface Software by Operating System



2007 = 480.4 Thousands of Units

~0.8%

Other

# **Chapter 5 Supplier Profiles**

The following pages provide profiles of the leading suppliers to the HMI Software market. These profiles analyze the total business of each company. Information on served markets and alliances is also provided where appropriate. This information was derived from company annual reports and in-depth discussions with senior company officials.

#### **Adroit Technologies**

189 Witkoppen Road Fourways, 2055, Johannesburg, South Africa

#### www.adroit.co.za

Adroit Technologies has been developing HMI/SCADA software since 1988. Their windows-based product, Adroit, was first released in 1993 and is currently in version 7 of its release. Adroit Technologies is a privately owned company employing over 50 people. Although based in South Africa, its products are exported to over 10 countries worldwide. There are over 12,000 Adroit systems installed worldwide. Adroit provides its products via system integrators, distributors, and direct sales. Currently there are international distributors in the UK, Belgium, Holland, Poland, India, USA, Canada, Malaysia, Thailand, Australia, and New Zealand.

#### **HMI Software Business**

Adroit's SCADA package is a Windows application. The product is a Client/Server architecture allowing multiple servers and multiple clients to be incorporated in an enterprise-wide control network. Its open architecture allows users flexibility regarding their individual control strategy. Users and OEMs can access all attributes of all tags through any number of supported interfaces, including Web Services, ActiveX, OLE, and COM. The product is scalable starting at 30 tags to unlimited tags, and users only pay for real world I/O scanned. Adroit boasts systems in excess of 65,000 real-world I/O on a single server, with a total of 1,000,000 virtual and real tags in the server at a diamond mine in Africa.

Adroit's DLL-based implementation of object-oriented design allows systems to be extended by end users or integrators to include new data types, as well as drivers. Scanning is protocol-based, and the server architecture supports remote time stamped data, making it a suitable product for the telemetry environment. To this end, Adroit has native DNP 3.0 and IEC 850 drivers for the utility markets. Adroit supports most common open interfaces, including OPC client and OPC server. A connection to OLEDB databases at a tag level makes for knowledge and reporting using an OEM version of their business intelligence and reporting tool, known as OPUS. Scripting is performed using Microsoft Visual Basic and/or Java. Adroit's Active Clustering offers users DCS style redundancy and incorporates real-time and historical data catch-up when cluster servers are returned or introduced. Alarming is performed using a routing system, with destinations being items such as alarm windows, paging systems, and multimedia files.

The latest version of Adroit includes full SNMP capability in both directions. Advanced alarm management, including full analysis and management dashboarding of KPIs, is based on the EEMUA 191 guidelines.

Adroit's OPUS software is in version 4.0 of its release and now offers connectivity into various competitor HMI/SCADA products, such as iFix, iHistorian, InSQl, WinCC, Adroit, OPC etc. OPUS is a business intelligence and reporting tool designed to share information across the intranet or internet. OPUS allows users familiar with Microsoft standard Office software to generate a wide range of internet real-time reports. Users are able to define and establish from their own requirements and extract reports unique to their production processes.

The latest offering from Adroit is the VIZNET Information Portal architecture and Smart-Client for the Adroit HMI/SCADA. Built on .Net and on the Microsoft Win forms architecture, it offers users the flexibility to build custom screens using any standard Windows or ActiveX controls, along with the Vector Graphics that users have become used to using with the product. The product integrates with Visual Studio 2005 and supports C# and VB.NET scripting at both the server and graphic form level. Native connectors are available for OPC, Adroit, Web Services, MySQL, and OLEDB. The wizard driven design environment allows users to deliver value by offering the capability to integrate both real-time and transactional data into a single user interface from different and disparate sources of data. All forms are available across the internet and in IE6.0 and above.

#### **Afcon Industries Group**

23 Hayetzira St. Kiryat Aryeh-Petach Tikva 49512, ISRAEL

#### www.afcon-inc.com

Afcon Industries Group (AIG) is engaged in the design, manufacture, sales, and installation of a range of electromechanical equipment and industrial control systems. The company employs over 850 people in the US, Europe, Asia, and Africa and has distributors in 40 countries. Afcon's customer base spans the industrial spectrum from public utilities to the Petroleum, Chemical, Metal, and Food industries.

The company has four major divisions. The Electro-Mechanics division includes manufacturing activities and HVAC contracting, including associated civil and mechanical engineering. The Trade division represents products and systems of multinational companies and has a variety of electrical and control products serving a range of customers. The Gas Technologies division provides engineering, supplying, assembly and building, integration and maintenance services for constructions of Natural Gas PRMS stations. The Control and Software division includes control and automation systems and also fire and security systems.

#### **HMI Software Business**

As part of the Control and Software division, Afcon Software and Electronics is the organization behind all HMI/SCADA software in the group, providing software solutions in the areas of both HMI/SCADA and SMS messaging, ranging from the plant floor and building automation management to OEM applications. Today, P-CIM consists of a development environment and a symbol library with thousands of industry standard images to create and maintain projects, allowing for shorter development cycles. It includes OPC Server and network connectivity, redundancy, an enhanced alarm window, database access, recipe management, real-time and historical trending, live video control, Web access and enhanced reporting generation. Afcon also offers software and hardware systems. These solutions may be based on the products and other existing technologies developed in-house, or on tailored solutions according to customer's specification. They also provide services such as consultancy, technical support, writing specifications, design and research.

#### **ARC Informatique**

2 Avenue de la Cristallerie 92310 Sevres, France

#### www.arcinfo.com

Founded in 1981, ARC Informatique is a privately held company with headquarters in Sevres, France. ARC Informatique manufacturers and markets HMI software, initially for the process industries, but it is now focused for infrastructures, utilities, and BMS as well. About 85 percent of the company revenues are realized in Europe, primarily in France. The company is establishing an international presence through the recent opening of direct sales offices in the US and Asia. In addition to using distributors as a sales channel, the company also has distribution agreements with Alstom, Jumo, Krohne, Matrix Controls, Quantum Automation, Schneider Electric, and Yokogawa that allow these companies to ship versions of ARC Informatique's HMI software under private label. To date, over 30,000 licenses have been shipped.

#### HMI Software Business

Software	Platform
PcVue	Multi Stations HMI/SCADA for Windows Vista, XP and 2008 Server
FrontVue	Graphical User Interface for Windows Vista/XP using Microsoft Technology (Visual C++, MFC, COM/DCOM)
PlantVue	Single Station HMI for Windows Vista/XP
WebVue	Remote Display and Control through a Web Browser

#### **ARC Informatique's HMI Products**

ARC Informatique's HMI/SCADA software, dubbed PcVue, has undergone several iterations since the DOS-based version was first introduced in late 1985. OS/2 and Windows 3.1-based PcVue2 were introduced in 1992 and 1993. Late 1994 saw the introduction of PcVue32, which incorporated the latest 32bit technologies from Microsoft as a common application for both Windows NT and 95. The latest versions are designed for Windows Vista, XP and 2008 Server.

In addition to its structured database, the HMI/SCADA functionality in PcVue includes historical and real-time trending with options to visualize and analyze multiple streams of data. A library of 2D and 3D graphical objects reconfigured for animation on display screens is available. These objects can be dynamically modified and the modifications are immediately propagated on each station of the network, realizing a key benefit of object technologies. PcVue supports OPC as well as Web Services for data exchange with other third party packages. ARC Informatique employs a

centralized database that is shared among the nodes in a Client/Server model, and the configuration of each station can be stored on the server and downloaded at start-up. It can also be used in conjunction with WebVue for remote display and control via an Internet or Intranet connection.

ARC Informatique has introduced several new applications, which include PcVue for FDA 21 CFR Part 11 and PlantVue, a low cost stand-alone HMI software for Windows Vista and XP. Designed for panel PCs, it is an OPC client that has many pre-configured features and a configuration option in which all the pre-configured settings become available for modification as required. PlantVue includes a Microsoft SQL Express Engine and a Microsoft VBA. An optional driver pack with Serial and Ethernet drivers for most major manufacturers can be provided.

FrontVue is a GUI product with graphics and animation capability developed for Windows XP using Microsoft technology (Visual C++, MFC, COM/DCOM). FrontVue has an object-oriented design and hierarchical or flat data structure. Customized functionality is provided by using third party ActiveX, Java Beans and an integrated Microsoft VBA (Visual Basic for Application) engine with full access to all the graphic objects. FrontVue can be used to visualize a process either standalone or as the client of a third party application such as a HMI/SCADA package (PcVue and Plant-Vue), MES or Point of Sales.

#### **Citect/Schneider Electric**

Citect 3 Fitzsimons Lane Gordon, NSW 2072 Australia www.citect.com

Schneider Electric 245, Route de Lucioles, BP 147 06903, Sophia-Antipolis Cedex, France www.schneider-electric.com

Citect, a global provider of HMI/SCADA software and next generation manufacturing execution systems and professional services, was acquired by Schneider Electric in April 2006. With operations in 130 countries, Schneider Electric's organization is based on strategic business segments that develop products, and then bring them to market via country organizations and provide front-line services. Today, Schneider Electric's Automation & Control strategic business segment is responsible for global product development strategies for a broad range of industrial automation products, including MES, HMI, SCADA, IPC, PLCs, I/O, Drives and related software. Citect will provide the MES and HMI/SCADA software products in this portfolio.

#### **HMI Software Business**

Citect differentiates itself from its competitors with features like DCS style redundancy, scalability and flexibility. Citect systems are only sold one way, as a complete, integrated package, with all the protocols and drivers included.

Citect currently offers numerous major applications modules including CitectHMI; CitectSCADA; CitectSCADA Pocket; CitectSCADA Batch; CitectFacilities; CitectSCADA Reports; and a suite of manufacturing execution systems Ampla modules including Metrics, Production, Downtime, Maintenance, Recipe, Planner, Knowledge, Tracking and Quality. For Schneider Electric, Citect has developed new two products called Vijeo Citect and Vijeo Historian, which offer tight integration with Schneider Electric equipment, such as PLCs, RTUs, Web Servers, HMI panels, and Power equipment.

Citect's strategy has been to leverage their systems integration background to build a reliable, flexible and full-featured HMI/SCADA software pack-

ages that can be used across all industry segments. Citect's strengths include scalability and the ability to target applications with large I/O point counts, up to hundreds of thousands of I/O, that are looking for a lower cost than the typical DCS system. Citect has existing installations networking over 100 workstations without significant loss of performance.

The CitectSCADA design is centered on multi-level redundancy for constant communication from the server to remote controllers, such as PLCs and RTUs. CitectSCADA interfaces to hundreds of different I/O devices including PLCs, RTUs, and DCSs from over 100 manufacturers. During 2007, CitectSCADA introduced the next generation, version 7, which included the ability to cluster multiple systems together and introduced client-side online changes.

CitectSCADA Batch is a scalable batch management solution marketed at applications seeking lower Total Cost of Ownership (TCO), increased productivity and consistent quality. CitectSCADA Batch integrates with existing systems and facilitates compliance with international regulations. These solutions are supported by partner programs and are sold in numerous industries including Water & Wastewater, Facilities Monitoring, Gas Pipelines, Mining, Dairy, Food Processing, Pharmaceuticals, and Power Distribution.

Based on CitectSCADA, CitectHMI is an entry level HMI software designed and sold exclusively to OEMs. CitectHMI operates on embedded Windows platforms and is currently used in a wide variety of OEM applications targeted at both Machine and Panel OEMs.

CitectFacilities is a PC-based system for integrating multiple networks to monitor and control security, HVAC, lighting, electrical distribution, fire detection, elevators, and related building, facility and shipboard management reporting functions. Centralized monitoring allows facilities managers to monitor energy efficiency and security and integrate reporting to IT systems across wide area networks. CitectFacilities is targeted at users seeking to reduce operating and maintenance costs by tracking and reporting energy use, reducing energy consumption, and generating customized reports. CitectFacilities can also connect to video monitoring, card-based access, and record keeping for additional security.

CitectSCADA Reports is a powerful historian combined with a plant-wide reporting tool that collects, histories and reports on data from
HMI/SCADA systems using industry standard technology. It is one of the first historians released to the market based on Microsoft SQL Server 2005.

Citect has developed an innovative conversion tool called Switch2Citect that allows customers to simply and reliably upgrade their legacy control systems. This reduces their TCO by minimizing conversion and on-going maintenance costs and provides opportunities to take advantage of the latest technologies to improve productivity at their plants. Switch2Citect currently includes importers for Fix32, iFix, InTouch, FactoryLink, RSView32, WinCC, Cimplicity, Genesis32, Wizcon, OASyS, Vijeo Look, and MonitorPro.

# **COPA-DATA**

Karolingerstr. 7B 5020 Salzburg, Austria

## www.copadata.com

COPA-DATA GmbH, a European software provider with headquarters in Salzburg, Austria, has been developing HMI/SCADA systems since the mid-eighties. With their zenon product, COPA-DATA brought to the market one of the first completely Windows-based graphic visualization systems for all Windows platforms, ranging from Windows CE up to Windows 2000/XP/Server 2003, including 64-bit versions, Vista and all the way to the web. zenon was one of the first HMI/SCADA software products to be certified for Windows Vista. With more than 70,000 installations of the zenon product suite, COPA-DATA is one of the leading HMI/SCADA system suppliers in Europe. COPA-DATA supplies the zenon product worldwide through a system of subsidiaries and distributors. It is of special concern of COPA-DATA to maintain compatibility between existing products and their latest product versions, and to deliver value through usability.

## **HMI Software Business**

COPA-DATA offers a suite of HMI/SCADA-based products that include the zenon SQL-Server, Web Server, Industrial Performance Analyzer (IPA), Industrial Maintenance Manager (IMM), Production and Facility Scheduler (PFS), and STRATON, which is an integrated control solution. COPA-DATA's zenon product family is developed completely on Microsoft tech-

Automatic Engineering Efficient Reusability International Language Switching Intelligent Integration Object-Oriented Parameterization Network Technology

**COPA-DATA's Promotes zenon** 

nology, providing users with applications that run on Windows CE/2000/XP/Vista /Server 2003 that are fully compatible with past versions of zenon. Projects for Windows CE and Windows 2000/XP/Vista/Server 2003 are created with one single engineering tool. zenon 6 also meets all FDA 21 CFR Part 11 requirements with the single click of the mouse. An important feature called circular redundancy allows decentralized systems to be interconnected for n+1 cross-redundancy to ensure failsafe operations at very low cost and with a single mouse click.

6 Based on Six Features cost a

COPA-DATA promotes their zenon 6 product family by emphasizing what they consider are its six main features. Automatic engineering enables intelligent and customizable (VBA) wizards to handle recurring tasks on their own. Efficient reusability consists of using import/export features for parts of projects or entire projects. International language switching utilizes full Unicode integration, which allows any number of languages and fonts to be handled in parallel, switched online, and defined in an Editor that is also available in seven languages. Intelligent integration enables having a single central data source for variables that are open for each connection. Objectoriented parameterization, where graphical objects and data definitions only have to be defined once, and Network Technology are leveraged by decentralizing and providing direct access and fast reaction times to lowerlevel projects, even at a low bandwidth, and the intelligent one-clickdeployment to minimize maintenance tasks. The network technology supports, for example, a traditional Client/Server solution, a multiserver/ multiclient solution, and a de-centralized hierarchical structure.

The zenon WEB Server brings visualization into the Internet. Configuration changes to zenon HMI projects are automatically updated on a standard WEB Browser. With the zenon WEB Server, the production can be monitored company wide. Company business systems have access to production process information. Remote monitoring of plant operations is available via the zenon Web Server as well as access to CE terminals. Additionally, zenon offers built in web access and remote desktop engineering.

The zenon Industrial Performance Analyzer helps to analyze alarm data statistically. This is so downtime in a facility can be minimized and the productivity and effectiveness can be considerably increased. With the Production and Facility Scheduler (PFS), zenon has a fully integrated plant calendar that controls facilities and production processes by date, time, event, and production status. zenon has a configurable self-documentation facility that automates the otherwise onerous task of providing project documentation and revision documentation.

STRATON is a platform independent PLC-based on IEC 61131-3 that is fully integrated in zenon, delivering an effective internal logic engine. This provides a fast and secure configuration for Soft-PLC/SCADA-Logic solutions as well as for all PLCs with STRATON embedded. It enables simple programming independent of the hardware used directly from zenon. The Soft-PLC STRATON runs on the Windows operating systems 2000, XP, XP embedded, Vista, Server 2003 and CE 4.x to 6.0. The program interface supports all five in the IEC-defined languages, SFC, FBD, ST, IL and LD, and all current field bus systems. The integration of the PLC development environment in the HMI/SCADA system zenon offers many configuration advantages, such as simple variable handling, comprehensive support of complex data types (structures), and object-oriented configuration for both the PLC and the HMI/SCADA system.

COPA-DATA's zenon takes a new approach to HMI/ SCADA that delivers value through usability and in-built functionality that effectively gets the job done. Applications are found in all industrial sectors and also increasingly in Building Automation and Energy Distribution.

## **ELUTIONS - Wizcon Systems**

Parc Technologique de Lyon 12 allée Irène Joliot-Curie F-69791 Saint-Priest Cedex, France

# www.wizcon.com www.elutions.com

ELUTIONS Inc. was originally founded in 1992 by TECO Energy (Tampa Electric Company) and was formerly known as TeCom. ELUTIONS Inc. is headquartered in Tampa, Florida with an R&D department in Waukesha, Wisconsin and in Lyon, France.

ELUTIONS is a technology consulting company specialized in improving the management of physical assets, energy, and security across multiple sites. ELUTIONS' solutions are designed to help manufacturers improve asset efficiency, uptime and lifecycle, as well as to create new revenue opportunities and reduce service and maintenance costs across multiple sites. ELUTIONS' solutions are also designed to help manufacturers reduce energy usage and costs while providing higher asset security.

In September 2006, ELUTIONS Inc. acquired the Wizcon Systems company, founded in 1988, to complete its M2M enterprise asset and energy management offerings and to address European market opportunities based upon established references in the US. ELUTIONS Europe is headquartered in Lyon, France and has offices in the Netherlands (ELUTIONS B.V.) and the UK (ELUTIONS Ltd.) with direct sales all over Europe and a sales channel with over 30 authorized distributors and partners in over 30 countries. Worldwide, ELUTIONS Inc. has over 120 employees, including an R&D pool supporting a global customer base, providing all worldwide research & development, project management, customer support, marketing and sales activities for ELUTIONS offerings.

## **HMI Software Business**

ELUTIONS' new ControlMaestro HMI Software platform unites and advances the legacy of both Wizcon's and ELUTION's most advanced technologies. ControlMaestro is based on Wizcon's 20 years of automation application experience and Web expertise with Wizcon Supervisor, along with ELUTIONS' 15 years of M2M enterprise asset management experience and wireless technologies. ControlMaestro is a complete Internet-based solution for process control. It combines operator interface, supervisory control, and soft logic capability with Internet technology to transform classical HMI/SCADA software into a real decision-support system that helps manufacturers build complete automation solutions. The Web-based HMI/SCADA software has a built-in ability to publish real-time information for viewing in Web browsers. This Web-enabled HMI/SCADA tool delivers real-time and historical information from the plant floor to the enterprise. It provides full HMI/SCADA functionality for operator displays on Windows Vista, plus it has the ability to publish the same information to any Web browser using ELUTIONS' Internet technology. ControlMaestro can be associated with an alarm module or a scheduler, as well as a vast set of options.

ControlMaestro is designed for applications involving mobility, remote services, biometric security, and productivity improvements, while providing long term sustainability, including Microsoft Vista compatibility. This platform supports biometry-based strong authentication and compliance with FDA 21 CFR 11 system security rules. ControlMaestro enables wireless services by means of bundling to utility meters, modems, and controllers, such as ELUTIONS' Wireless Logic Controller. ControlMaestro offers current Wizcon users an easy migration path to higher value in the monitoring and control of their mission critical applications.

Wizcon Supervisor V9.4 is a complete HMI/SCADA suite of control and monitoring products for industrial automation software systems that allow users to manage and control real-time processes locally from a PC or remotely via the Internet using a standard Web browser. Wizcon Supervisor combines operator interface, supervisory control, soft logic capability, and Internet technology to transform classical HMI/SCADA software into a real decision-support solution and supplies the software tools needed to build a complete automation solution. Wizcon Supervisor was first launched in 1988 and today has over 60,000 licenses deployed around the world, most in mission critical applications.

# **GE Fanuc Intelligent Solutions**

2500 Austin Drive P.O. Box 8106 Charlottesville, Virginia, USA 22906

## www.gefanuc.com

GE Fanuc Intelligent Platforms, a joint venture between General Electric and FANUC LTD of Japan, is a high-performance technology company and a global provider of hardware, software, services, expertise, and experience in automation and embedded computing, with products employed in many industries including manufacturing automation, Defense, Automotive, Telecommunications, Healthcare, and Aerospace. GE Fanuc Intelligent Platforms is a worldwide company headquartered in Charlottesville, Virginia, and it is part of GE Enterprise Solutions.

## **HMI Software Business**

GE Fanuc is a major supplier of HMI/SCADA software, serving industrial users with four HMI-related applications: Proficy HMI/SCADA iFIX, Proficy HMI/SCADA CIMPLICITY, Proficy Machine Edition View, and DataViews. Each has its own specific benefits and areas of specialization, as well as a range of bundled operator interfaces and industrial PC hardware solutions. GE Fanuc continues to develop all four product lines, focusing on OEM productivity solutions, continuous process solutions, hybrid solutions, and solutions for discrete applications, intelligent production management solutions, and enterprise connectivity solutions. As an example, these solutions include Web-centric software platforms so that applications, business suppliers, and customers can work off the same information in real-time. GE Fanuc interfaces its HMI applications down to the machine level hardware components, both to its own hardware and third party products, as well as to higher-level systems, including to its own and third party MES/CPM and historian solutions. Additionally, in the case of DataViews, GE Fanuc offers an application that allows customers to build their own HMI solutions using a powerful set of development tools.

GE Fanuc continues to enhance its HMI software to ensure connectivity to a wide variety of devices and to provide tight integration with the rest of its Proficy software offering, including integrated change management support. GE Fanuc sees HMI/SCADA solutions increasingly becoming a

Software

Proficy HMI/SCADA iFIX

Proficy HMI/SCADA CIMPLICITY

Proficy Machine Edition - View

DataViews

GE Fanuc's Four HMI-Related Applications component in a much broader automation strategy. The pervasive use of this technology is enabling a focus on the natural progression of automation, providing the ability to take data collected by HMI/SCADA applications and putting it to greater use. Therefore, when advanced higher-level analytic and production management tools are added, the value of HMI/SCADA information increases substantially.

Proficy is an open, scalable, and functionally complete family of software products, delivering HMI/SCADA applications along with new capabilities that provide a natural extension of functionality to those solutions. Proficy is a broad set of software solutions designed to deliver value from the plant floor operator, to the plant manager, to business decision makers throughout the organization. GE Fanuc's Proficy production management products provide capabilities that go well beyond HMI/SCADA functionality. These solutions deliver information that spans the automation systems, combining the various data sources and delivering results for use back into HMI/SCADA systems.

As GE Fanuc continues to invest in iFIX and CIMPLICITY, there will be an increased use of common components that leverage the strengths of the products while continuing to provide new value to manufacturers. CIM-PLICITY and iFIX are both tightly integrated into the overall Proficy solution, enabling customers to leverage their investment in their HMI/SCADA systems while scaling their system to include MES and production management solutions.

iFIX, part of GE Fanuc's acquisition of Intellution, provides process monitoring and control, data collection, graphic display, historical reading, alarming, data archiving, and security for an unlimited number of I/O points. iFIX features include a graphical user interface (GUI), which aids in installation, implementation, and system expansion; support for OPC, SQL, ODBC, OLE DB, COM, ActiveX and user-written programs; and compatibility with Microsoft Windows 2000/XP/Vista and Server 2003. The latest version of iFIX features full process visualization, data management, supervisory control, and terminal services support. With a heavy reliance on industry standards, such as VBA and Active-X Container Technology, iFIX is positioned as an integration platform, marrying plant floor applications with higher-level business systems.

iFIX also is GE Fanuc's predominant solution in the Pharmaceutical and Biotechnology industries through the provision of tools that aid companies in being compliant with 21 CFR Part 11 regulations. Of particular interest to companies and other businesses struggling to meet these requirements of the FDA is the point verification feature that enables a comprehensive change management solution. With point verification, users are required to enter username and password each time a change is made to the HMI/SCADA system, or to perform specific actions within the process.

The software also enables users to view plant process graphics in real-time through any standard Terminal Server thin client applications. iFIX's open architecture allows the software to provide plant floor data across the enterprise and into any business system. Over the years, iFIX has supported efficiency and optimization applications running and exchanging data with the plant floor to identify and reduce downtime events and conduct operational efficiency analyses. iFIX can collect and organize this equipment and line downtime information, providing a complete summary of downtime events by location and reason for the event.

CIMPLICITY has roots that trace back more than 25 years as a tool used by GE's corporate consulting organization for large project implementation. In order to re-use the software assets developed for these projects, GE packaged them into configurable and reusable modules. These modules evolved and expanded, becoming the base of the CIMPLICITY products. Originally focused on plant-wide supervisory systems for automotive and other manufacturing and process applications, CIMPLICITY includes an entire line of products and services to provide increased productivity through digitization. CIMPLICITY has been applied in variety of industries including Power Generation, Power Distribution, Water, Wastewater, Oil & Gas, Discrete Manufacturing, Metals & Mining, and Facilities Management.

CIMPLICITY is based on an open, distributed Client/Server architecture and provides plant wide data collection, distribution, and visualization to users across extended enterprises. The product is scalable and supports both symmetric multiprocessing architectures and multi-user systems. CIMPLICITY clients are Internet-enabled and provide platform independent visualization to wireless Windows CE-based operator interface devices. CIMPLICITY connects to enterprise-level systems to distribute production requirements to the shop floor and feedback production results.

CIMPLICITY supports Microsoft Windows 2000/NT/XP/Vista/CE and such standards as OPC, OCX, ODBC, ActiveX, and COM/DCOM. CIM-

PLICITY has both an OPC Client and Server for both data and Alarms and Events, providing integration with devices and other software applications.

Proficy Machine Edition provides interoperable machine-based HMI, motion, and control technology. It is suited for machine OEMs and connects into higher-level systems to accommodate collaborative manufacturing. Machine Edition features an integrated development environment providing visualization, a motion development environment that includes drive function and axis configuration wizards, and multi-target (PLC and PC) logic control environments. A built-in Web server publishes screens and data to standard Web browsers with a configuration checkbox.

Proficy Machine Edition View, the HMI application, is an intuitive machine-level graphical interface for shop-floor devices including PACs, PLCs, CNCs, motion controllers, marquees, serial devices, and other machinelevel components, with an all-inclusive graphics tool that allows the user to create objects within the common object repository, or tool chest. Many parts of the programming environment are supported by the tool chest, including alarm groups, logging groups, scripts, graphical objects, panels, motion blocks, ladder-logic instructions, charts, variables, and custom objects. View also offers Web-publishing technology, allowing devices to post data and graphical panels on the Web for real-time decision-making.

DataViews, which GE Fanuc acquired from Dynatech Corporation, helps users build graphical software displays for visualizing information used to control and monitor real-time processes. Programmers use DataViews to create their own HMI while maintaining their chosen programming languages and platforms. This is a scalable development tool that provides monitoring and control of complex systems in industries ranging from Petrochemical and Power Generation to Maritime and Telemetry. With regard to DataViews, GE Fanuc focuses on developing interface technology, adopting industry trends and standards, taking an open-systems approach, and putting a premium on application performance.

DataViews offers C, C++, Java, and Visual Basic tools for the development of interactive graphical applications. In addition to offering programming tools powered by open APIs, the company supports open component technologies such as ActiveX. Applications built with DataViews' products can be deployed as stand-alone, Client/Server, or Web-based applications and can also be deployed in component form for incorporation into other applications.

## **ICONICS**

100 Foxborough Blvd. Foxborough, Massachusetts, USA 02035

### www.iconics.com

ICONICS is a privately held company with headquarters in Foxborough, Massachusetts (USA), near Boston. The company has offices throughout the United States as well as in The Netherlands, United Kingdom, Australia, China, France, Italy, India and Germany. ICONICS also has a joint

Software	Function
PortalWorX	Manufacturing Portals and Visualization Dashboards Based on .NET Web Parts
BridgeWorX	Enterprise Data Bridging With No Programming
ReportWorX	Report Info from Any Data Source
GraphWorX32	HMI Visualization OPC Client
Alarm Analytics	Standards-based Alarm Management, Reporting and Analysis
Productivity Analytics	Visual OEE, KPIs and Analysis for Operational Excellence
TrendWorX32	Data Collection, Historian & Trending
AlarmWorX32	OPC Alarm Multimedia Product
DataWorX32	OPC Data Exchange & Redundancy
ScriptWorX32	Multi-threading Periodic, Event and Alarm VBA6 Based Scripting
ProjectWorX	Collaboration, Deployment and Project Management
VCRWorX	Historical Plant and Business Data Replay, Module Data and Alarms
WebHMI	Web-based Thin Client for Internet Explorer and NetScape Applications
MobileHMI	WAP/Internet, PDA Phone Clients
Pocket GENESIS	Wireless Pocket PC-Based Industrial Software
MachineWorX	Low cost diskless OEM Visualization

**ICONICS' Software Components and Tools** 

software development and sales office in the Czech Republic.

ICONICS, in its 22nd year, has served over 225,000 customers in thousands of facilities worldwide since its founding in 1986. ICONICS is a data visualization software company providing visualization of both real-time and historical data from the manufacturing floor to the enterprise.

ICONICS, A Microsoft Gold Certified Partner, has recently been awarded the Microsoft's 2008 ISV Partner of the Year Award for the GENESIS64 HMI/SCADA suite. ICONICS products run on multiple Microsoft Windows platforms including Windows Server 2008, Windows Vista, Windows XP, Windows XP Professional x64, Windows 2000, Pocket PC, Embedded XP, Windows 2003 Server and Windows 2003 Server x64.

ICONICS' primary offerings are the GENESIS32 and GENESIS64 HMI/SCADA Visualization Suites for real-time manufacturing data, and its BizViz solution for bridging the plant floor to the enterprise through reporting, wireless, mobile, and data-mining portal technologies based on Microsoft .NET and SharePoint Server.

ICONICS sells equally in the process as well as the discrete markets, with primary markets in Automotive, Building Management, Food & Beverage, Oil/Gas/Petrochemical, Machine Builders, Pharmaceutical/Biotech, Security, Water/Wastewater, Utilities, and Government Infrastructures.

Target markets include HMI/SCADA, Manufacturing Intelligence, realtime data acquisition, and laboratory control, with focused efforts on OEM, distribution and large PC-based applications. The company holds several patents for its use of OPC data exchange.

The past 20 years have been witness to the acceptance of its flagship product, GENESIS32, a fully scalable suite of OPC Web-enabled HMI/SCADA applications. The company also entered the Manufacturing Intelligence/Business Visualization arena with its BizViz suite. ICONICS has recently introduced GENESIS64, a 64-bit-based version of its OPC-UA integrated, Web-enabled HMI/SCADA solutions. Also, GENESIS32 V9.1 introduced a calendar-based scheduling tool, ScheduleWorX32, while Biz-Viz V9.1 introduced Productivity Analytics.

## **HMI Software Business**

ICONICS derives 40 percent of revenues from what it classifies as strategic OEMs. Some of the OEMs that brand label ICONICS modular and Webenabled products are Johnson Controls for building controls and security systems; Endress+Hauser, which is sold as P View; Bristol Babcock; Mitsubishi Electric North America, which is sold under the MCWorX brand; Phoenix Contact, which is sold as PCWorX; Smar International, which is sold under the System 304 brand; Kuka Robots; Eaton/Cutler Hammer; and NOVAR.

ICONICS offers GENESIS32, a complete Automation Suite of HMI, SCADA and visualization products designed from the ground-up as WIN32 applications based entirely on the OPC specification for data access, alarm & event, and OPC historical data access. The products are also compliant with Microsoft DNA for manufacturing and Microsoft's newest .NET and Share Point Server technology. GENESIS32 is modular, and any of its components can be sold separately for a third-party solution or OEM applications. GENESIS32 was designed and based upon COM/DCOM, VBA and ActiveX technologies.

ICONICS provides toolkits for the development of OPC servers, clients and OPC-enabled ActiveX controls. It also provides toolkits for creating OPC redundant applications. ICONICS also has built in OPC Tunneling in their solutions.

ScheduleWorX, part of GENESIS32 V9.1, is a calendar-based scheduling tool that can be used in many different applications, including discrete, process (batch), and building automation. Specific targeted applications include lighting control, HVAC control and energy management. ScheduleWorX32 allows users to create sequences of automatically executed commands. Sequences can be configured in chronological patterns, such as regular weekly or daily schedules. Special conditions, such as holidays, can be easily accommodated. Schedules can be modified online or manually overridden by an operator.

ICONICS' latest industrial automation software solution, GENESIS64, is their next generation in software automation. The new suite takes advantage of 64-bit computing to reduce costs associated with application engineering. GENESIS64, designed and certified for Windows Vista and Windows Server 2008, coupled with 64-bit technology processors from AMD and Intel, allows for faster development of automation solutions.

GENESIS64 utilizes key features within Windows Vista and Windows Server 2008 to provide customers with a 360-degree view of their entire organization. These include universal data connectivity using Windows Communication Foundation (WCF), real-time KPI Gadgets/Windows Vista Desktop Sidebar technology, an enriched user experience via Windows Presentation Foundation (WPF), hardware-accelerated graphics for 3D visualization, increased security via User Account Control (UAC) integration, Virtual Earth Geographical Information System (GIS) integration, Windows Vista Search & Organize technology, and Windows Workflow Foundation (WF) for secure, real-time data communications.

ICONICS' new solution makes full use of the latest in graphics capabilities. GENESIS64 takes advantage of the graphic hardware acceleration through DirectX10, powered by Windows Vista. GraphWorX64, a component of the suite, provides users with 3D views of their operations in real-time with live data. It provides the ability to view how equipment is running, in real-time, from any angle, a thorough approach to visualization.

All ICONICS products are designed to be customizable using the ICONICS OEM Toolkit. The OEM Toolkit provides instructions and tools for updating registry entries, so that all products can have the OEM logo, splash screens, corporate messages and other OEM fields. ICONICS products, which are integrated into Microsoft Windows Server 2008, Windows Vista, Windows XP, Windows XP Professional x64, Windows 2000, Pocket PC, Embedded XP, Windows 2003 Server and Windows 2003 Server x64, were developed using Unicode and are thus designed to support international runtime language switching capabilities. ICONICS products are delivered in eight languages.

An important part of ICONICS' HMI software product strategy is the abili-

Software	Function
AlarmWorX64	Next Generation ICONICS Alarm Management Software
GraphWorX64	Design Vector-based Graphics with Vista Aero Look and Feel
TrendWorX64	Configuration and 3D Viewing of Real-time and Historical Data
EarthWorX	Visibility for Geographically Dispersed Assets
Hyper-Historian	High speed Plant Historian
Workbench	GENESIS64's Centralized Configura- tion Environment

#### **GENESIS64 Suite Applications**

ty to offer a "free single development system with many targets" approach. Utilizing a single development environment, OEMs and users can configure run-time applications for multiple Windows-based targets. Applications can also be published to Web servers, such as Microsoft IIS, providing a complete Webbased HMI/SCADA solution. Other targets supported are Oracle, SQL, Access, MSDE databases, Web-integrated mobile phones, pop-up windows, marquees, embedded controls and browsers. ICONICS MachineWorX runs on Embedded CE and Embedded NT/XP platforms.

Pocket GENESIS is a handheld wireless Pocket PC application using 802.11 and GPRS technologies. From any hardware running a Pocket PC, users have access to live HMI/SCADA displays, alarms, and trend information. Pocket GENESIS is a full 32-bit, multi-threaded, distributed Client/Server application based on ICONICS OPC-To-The-Core technology. It is compliant with the OPC Data Access (DA), OPC Alarm and Events (AE), and Historical Data Access (HDA) specifications. Designed for situations ranging from small machine control to mobilizing a workforce in very large, distributed environments, Pocket GENESIS is a suite of applications ready to plug-n-play with any Microsoft compatible Pocket PCs.

VCRWorX32 replays and visualizes historical, archived data from plant and business systems. With the VCRWorX32 on-screen graphical user interface control, users can view historical plant and business information. VCRWorX32 is designed to work on desktops, LANs and Web applications.

The ICONICS BizViz suite of real-time performance management and manufacturing intelligence products can bridge the gap between manufacturing and corporate business information systems. The core of ICONICS' new BizViz Suite is in its new data-mining and Web portal technologies.

BizViz is completely written from the ground up using C#, Microsoft .NET, and SharePoint technology integration. ICONICS' BizViz Suite enables the bridging of real-time industrial or corporate databases. Users are able to integrate information from different data sources, including Microsoft SQL Server, Oracle, SAP, OPC HDA (Historical Data Access), OPC AE (Alarm and Events), and OPC real-time information. The BizViz suite provides downtime analysis, KPI, and OEE through manufacturing portals and digital dashboards.

MobileHMI is designed for wireless and Web-enabled devices, such as Web browsers, mobile phones, Pocket PCs, Palm, Blackberry, and PDA devices. MobileHMI turns data from different sources into information on a Web browser, mobile phone or PDA. MobileHMI supports a range of standards, including OPC Data Access, GSM, TDMA, and CDMA wireless application protocols (WAP). This provides the ability for plant personnel to acknowledge alarms and analyze real-time information about their automation operations directly from their mobile devices.

ReportWorX data mining technology takes data from different sources and turns it into information in the form of reports. Reports can be created using a .NET Microsoft Excel plug-in. ReportWorX wizards can schedule reports based on time, date, events, OPC values, or database values. Reports can be redirected to printers, e-mail, fax machines, disk, desktops, and Adobe Acrobat PDFs, and can also be published to Web servers. Report-WorX comes with regulatory report templates as well as several other industry-specific reports. BridgeWorX performs data exchange to and from a database or data source. BridgeWorX has a visual transaction data-mapping configuration wizard that enables users to transfer information to and from real-time OPC manufacturing devices to corporate business information systems. BridgeWorX data-mining technology can access Microsoft SQL Server, Oracle, Microsoft Access, SAP and other real-time or archived manufacturing or business data sources. BridgeWorX's scheduler triggers "transactions" based on realtime OPC data, alarms, events, time, and date, as well as on database or file attributes.

PortalWorX is based on Microsoft's SharePoint Server .NET technology. It allows users to create and manage custom manufacturing and business portals and visualization dashboards that provide single sign-on and collaboration for optimization of key performance indicators (KPI). PortalWorX provides tools to create a portal for real-time, historical plant and business information.

Alarm Analytics provides Web-based alarm reporting, management and analysis. ReportWorX and AlarmWorX32 customers are able to utilize the comprehensive tool within a familiar Excel environment. The Alarm Analytics add-on module, meeting OSHA and EEMUA specifications, provides 15 report templates to present KPIs including alarm distribution, tag frequency/chattering, cross-correlations, operator response time/changes by interval, and worst factors. Benefits include intuitive alarm data presentation via a Web-based tool, convenient results storage into standard open databases (Access, Microsoft SQL, Oracle, MSDE) via AlarmWorX32 and quick ReportWorX export within Excel plug-in to Web, PDF, email, printers or FAX.

Productivity Analytics provides powerful data mining technology to track real-time key performance indicators (KPIs) such as throughput, OEE, utilization, yield, availability, uptime, cycle time and many more. Its powerful thin-client Web Interface allows users to design, develop, and deploy dashboards to effectively visualize vast amounts of available manufacturing and business information at a glance.

# InduSoft

200 Professional Building New Orleans Road Hilton Head, South Carolina, USA 29928

## www.InduSoft.com

Founded in 1997, InduSoft is a privately held company with headquarters in Hilton Head, South Carolina and offices in Austin, Texas; Walldorf, Germany; and Sao Paulo, Brazil. InduSoft develops tools and technologies to develop graphical interfaces, Web browser integration, and Internet connectivity. More than 25,000 InduSoft HMI/SCADA systems are operating worldwide. InduSoft targets users in the industrial automation, test and measurement, and embedded markets. InduSoft has developed a family of industrial software products, including e-automation development tools offering Web and wireless integration in process supervision, automation, instrumentation and control for all Microsoft-supported operating systems.

## **HMI Software Business**

InduSoft Web Studio is a supervisory control, process monitoring and operator interface software package. It includes such functions as an object oriented database, math functions, report generation, archiving, alarms, batch recipes, interface for PLCs, remote I/O, serial and TCP/IP networking. The drag-and-drop, point and click development environment enables users to mimic behaviors of their live processes.

InduSoft Web Studio is a SCADA system with Web Integration. Without additional tools, InduSoft Web Studio creates native applications that run on all Microsoft supported operating systems and Web-based HMI/SCADA applications. InduSoft's clients are able to use a standard Web browser to manage workstations; monitor, debug, and update software remotely; and access real-time, dynamic, and animated graphic screens, trends, alarms, reports, and recipes. In addition, InduSoft Web Studio facilitates automated data exchange with imports and exports to XML format. An alarm system sends alarms to screens, e-mail, browsers, and archives/sends to printer. An embedded VBScript interface allows users to create simple or sophisticated scripts and logics directly in the objects or background tasks.

Electronics
Electric Power
Fabricated Metals
Food &Beverage
Machinery
Oil & Gas
Pharmaceutical
Pulp & Paper
Water & Waste
InduSoft's
Primary
HMI/SCADA
Applications

Automotive

InduSoft provides the tools that allow users to configure applications in conformance with FDA CFR Part 11 regulation. It has established a multilevel security system/firewall for customer applications, including Internet and Intranet. Also, InduSoft has more than 250 communication drivers available for different devices, such as PLCs.

InduSoft's CEView is a supervisory control, process monitoring and operator interface software available for all Microsoft supported operating system platforms. CEView operates in handheld, PDAs, mobile phones and embedded PCs, targeted at both end user and OEM applications. CE-View is based on InduSoft's full-scale supervisory control and monitoring system and has all of the same features, including an object-oriented database, math functions, web capabilities, report generation, archiving, alarms, batch recipes, and interfaces for PLCs, remote I/O, and TCP/IP networking. CEView is a full-function supervisory control and monitoring system that fits in a hand-held device or can be embedded in the chip set of a lowcost operator interface. Applications include embedded machine or process controls, servo drives, control panels, man-machine interfaces, SCADA, data collection, maintenance terminals, PLC interface panels, machine parameter adjustment, and mobile process supervision.

## **National Instruments**

11500 N. Mopac Expressway Austin, Texas, USA 78759

#### www.ni.com

Founded in 1976, National Instruments (NI) is a public corporation and a supplier of computer-based measurement and automation solutions used in a wide range of industries. NI provides virtual instrumentation, including flexible application software and modular, multifunction hardware that engineers can combine with industry standard computers, networks, and the Internet to create measurement and automation systems.

#### **HMI Software Business**

While hardware sales comprise a large portion of its business, the flagship of the National Instruments software product line is LabVIEW, used pri-

Software	Description	Target Applications
LabVIEW	Measurement and Automation Software	Test, Measurement, Control, Manufacturing, and Design
Lookout	Object-Oriented HMI/SCADA Software	Process Control and Discrete Manufacturing

marily in the high-speed data acquisition applications required in many test and measurement laboratories and in real-time, deterministic control applications required on the factory floor. The firm's software products for the industrial

#### **National Instruments' Software Products**

automation market include the LabVIEW Real-Time Module, LabVIEW Data logging and Supervisory Control (DSC) Module, LabVIEW Touch Panel Module, and Lookout.

A key differentiator of National Instruments' LabVIEW is its patented graphical programming language, which engineers can use to simply assemble block diagrams to specify system functionality and deploy to distributed or stand-alone systems. LabVIEW is an open and flexible environment in which engineers can use external code, DLLs, .NET assemblies, and web services to connect to a variety of industrial automation devices and networks using built-in OPC and Modbus I/O servers. LabVIEW features a unified language for HMI, control, data acquisition, vision, and motion. With this unified language, engineers can work with disparate systems, using one software application, which decreases training costs. They can conduct communications between logic running on different hardware targets and HMIs through a unified tag database reducing development time.

The LabVIEW DSC Module, introduced in 1996, is a tool for developing HMI/SCADA applications capable of distributed monitoring and control. The latest version of the LabVIEW DSC Module includes unlimited tags and a built-in networked, SQL/ODBC-compliant, real-time, and historical database. The LabVIEW DSC Module offers interactive tools to manage high-channel-count applications by providing configuration-based data logging, alarming, scaling, and security. Engineers can optimize their automation systems by adding new hardware to an existing PLC infrastructure, and using the expanded connectivity options of OPC and Modbus I/O servers available in the LabVIEW DSC Module. This LabVIEW add-on module is used in applications that connect measurements to automation and business systems, monitor large numbers of I/O points, monitor and control machines for predictive maintenance, supervise distributed systems, and communicate with industrial controllers and networks.

Engineers can use the new LabVIEW Touch Panel Module to develop custom HMI applications for Windows CE-based targets. Communication to these local operator interfaces is made easy through the tags from the unified tag database used by LabVIEW and NI programmable automation controllers (PACs).

With the Lookout HMI/SCADA package, engineers have access to drivers for the latest programmable logic controllers (PLCs), distinctive icons to help identify different objects, and a floating toolbox for easy access to some of the most common menu commands and objects. A new version of the historical and real-time database was introduced to offer data access from ActiveX Data Objects (ADO) clients, improved open database connectivity (ODBC) support, and expanded data access. Multi-server, multiclient networking, integrated interactive Web support, distributed historical data logging, distributed alarms/events processing, and OPC client and server support are also included. The Lookout object-based technology eliminates the requirement for programming or scripting.

National Instruments is active in standards bodies, including the Fieldbus Foundation and OPC Foundation, across many industries. The company has integrated Internet/intranet access capabilities into its software products.

# **Parker Hannifin**

50 West TechneCenter Drive Milford, Ohio USA 45150

## www.ctcusa.com; www.parkermotion.com

The Electomechanical Division of CTC is part of the Automation group of Parker Hannifin, a publicly owned company located in Cleveland, Ohio. Parker Hannifin is a manufacturer of motion and control technologies and systems, providing engineered solutions for a wide variety of commercial, mobile, industrial, and aerospace markets. Parker Hannifin had over \$10 billion in sales and over 57,000 employees worldwide in 2007.

The Electromechanical Division of CTC, acquired as an operating unit of Parker Hannifin in 1998, is a supplier for PC-based HMI hardware and software. CTC offers three distinct HMI software products known as Interact, Interact Xpress, and InteractX. All of the products are offered bundled on CTC manufactured PowerStation industrial PCs. The Industrial PC and monitor products are also offered as standalone hardware products.

#### **HMI Software Business**

CTC's newest HMI software product is their Interact Xpress distributed HMI. Some of the key features that CTC is emphasizing with Interact Xpress surround its unique Web publishing capabilities. Xpress is one of the very few machine level HMIs that supports Web publishing into Internet Explorer with no additional software required. Each Internet Explorer client hosts an independent instance of the HMI application, allowing users to interact with different screens in the application simultaneously. These capabilities are particularly well suited to distributed HMI applications, such as large machines, remote monitoring, and utilities transmission, but

Software	Function
Interact	Windows Front End & DOS kernel-based runtime HMI software
Interact Xpress	Distributed HMI built on Adobe Flash technology
InteractX	Windows Front End & kernel- based runtime HMI software

**CTC's HMI Software Products** 

they are applicable in any application where there is a desire to distribute data to multiple locations. Xpress supports application development and editing directly on the XPR PowerStation hardware, web published into any Internet Explorer browser, or on an offline development package called Interact Xpress Manager. This flexibility allows simple changes to be implemented to an HMI application directly on the HMI hardware. The remote published development, and even supports hot edits of a running HMI application without requiring an application restart.

InteractX is CTC's supervisory level Windows HMI. Up to 80 percent of the information displayed in a typical supervisory system already exists in a machine level HMI application. Interact Xpress and InteractX combine to take advantage of this fact, and InteractX reduces supervisory application development time significantly. InteractX has been designed to host Web published screens from Interact Xpress with simplified configuration. This allows the screens created for the machine level applications to be directly imported into the supervisory application, so that they do not need to be recreated. Tag data can also be directly imported, allowing for easy data aggregation, trending, and logging at the supervisory station. InteractX require no proprietary scripting, as it is tightly integrated with Visual Basic for Applications (VBA). Licensed from Microsoft, InteractX includes the same VBA included in Microsoft Office products. VBA is fully integrated and has complete access to the object properties of InteractX panel tools, graphics, alarming, and tags. The user can write their own custom program in VB, C++ or other languages, or application code in Excel/Access.

InteractX also includes sophisticated tools for creating 21CFR Part 11 compliant applications, over 60 standard communication drivers, an OPC client interface so InteractX can communicate to any OPC server, an OPC tag server so all InteractX tags are available to be served to an OPC Client either running on the same machine or remotely over Ethernet, and multilanguage capability designed specifically for global support.

CTC has focused on its Interact HMI package since it was introduced in 1991. Interact is offered pre-installed on the PA PowerStation operator interface panels to provide process monitoring and control functionality, such as trending, machine configuration and data logging. Interact supports networking between HMI panels and one of the largest communications driver libraries in the industry. To maintain response times and reliability, Interact's runtime engine is based on a real-time DOS kernel, while the screen development tools are Windows-based. Interact is positioned as a low-to-mid-range package that is typically embedded in OEM equipment. Interact is offered as release version 6.17 and has a complete family of application modules, such as a Panel Tool kit, Graphics Monitoring, Alarm Management, Networking, Recipe Handling, Machine Configuration, Report Generation, Historical Trending, DDE Server, and Data Transfer.

## **Rockwell Automation**

1201 South Second Street Milwaukee, Wisconsin, USA 53204-2496

#### www.rockwellautomation.com

Rockwell Automation is a global supplier of industrial automation and information solutions that help manufacturers achieve a competitive advantage in their businesses. The company's capabilities extend through partnerships with a network of 5,600 local companies in distribution, services, software, and product referencing. Strategic partnerships allow Rockwell Automation to deliver industry solutions to over 80 countries around the world.

With headquarters in Milwaukee, Wisconsin, Rockwell Automation has two major product lines, Allen-Bradley & Rockwell Software, which offer a comprehensive suite of automation solutions that range from automation controls, manufacturing software, industrial components and intelligent motor controls, to global manufacturing support services.

## **HMI Software Business**

Rockwell Software focuses on solutions for plant-wide information and automation systems. Core disciplines include design & configuration, production management, data management, asset management, and performance & visibility. Plant-wide information supports the performance & visibility production discipline. These HMI hardware and software pack-

Element	Function
Logix Platforms	Single control architecture for seamless integration over multiple platforms and across common networking and software solutions
Performance & Visibility Hard- ware / Software Platforms	Scalable and unified suite of monitoring and control across the enterprise
NetLinx Communication Technologies	Provides control, configu- ration, and collection of information quickly, easily, and reliably

Rockwell Automation's Core Architecture Components ages present a window into the process.

The Rockwell Automation FactoryTalk technologies provide an integrated platform supporting common services built into Factory-Talk-enabled software products from Rockwell Automation and third-party vendors. Factory-Talk allows companies to share manufacturing data and common services while reducing the time needed to design, deploy and maintain integrated automation systems. The combination of FactoryTalk integrated production and performance software, along with the Logix Control Platform, which is an expansion of

Rockwell Automation's Integrated Architecture, allows Rockwell Automation to help manufacturers bridge the gap between the plant floor and business-level systems, and deliver relevant real-time information to the people and systems that need it.

FactoryTalk View is part of Rockwell Automation's Performance & Visibility offering of Integrated Architecture. The goal of Rockwell Automation and its FactoryTalk View series is to be consistent with the manufacturers' move to develop and implement common factory architectures. This includes a common development environment, application reuse, and an integrated architecture that promotes increased productivity and reduced operation costs. Built on the FactoryTalk Services-Oriented-Architecture, the FactoryTalk View series shares a set of common services with other Rockwell Automation software products.

FactoryTalk View Site Edition (formerly RSView SE) is targeted at site or plant level monitoring and control applications that require distributed and scalable architecture. FactoryTalk View SE includes runtime servers and clients that allow manufacturers to develop and deploy a multiserver/multi-client application along with a station-level version for a traditional single computer solution. FactoryTalk View SE supports the Microsoft Windows Server 2003 and Microsoft Windows XP operating systems and is targeted at manufacturers looking to meet regulatory compliance requirements through documentation of electronic signatures and information security. This plays a critical role in meeting and maintaining federal requirements for 21 CFR Part 11 and compliance, including authentication, electronic signatures, auditing and archiving. FactoryTalk View SE provides both HMI and data server redundancy enabled by FactoryTalk to help critical data remain available to clients, even during server disruptions. Client-side Visual Basic for Applications (VBA) permits customization of the application.

FactoryTalk View Machine Edition (formerly RSView ME) is a machinelevel HMI that supports both open and embedded operator interface solutions for monitoring and controlling individual machines or small processes. FactoryTalk View ME allows for a common operator interface across multiple platforms, including Microsoft Windows CE, Windows XP, Windows 2000, and Windows Vista solutions.

Delivering a common development environment across hardware and software platforms is important, and Rockwell Automation responds with its fixed HMI platforms, including PanelView Plus and VersaView industrial computers. Both include FactoryTalk View ME Runtime for running machine-level HMI applications, providing information in an operator interface that best suits an application's demands.

FactoryTalk View Studio is the common development and testing environment for both FactoryTalk View SE and FactoryTalk View ME applications. FactoryTalk View Studio supports editing and reusing projects for improved portability between embedded machines, lines, or plant level HMI systems. It allows for remote editing of HMI servers in distributed FactoryTalk View SE applications.

FactoryTalk View SE and FactoryTalk ME include FactoryTalk Security, runtime language switching, and global objects. FactoryTalk Security authenticates user identities and authorizes user requests to access a FactoryTalk-enabled system. FactoryTalk Security's user authentication determines who can open, create, modify, and delete application components, as well as on which computers the actions are allowed. FactoryTalk Security may also be used to add user and group security accounts, as well as Windows-linked accounts. Runtime language switching provides the ability to set up multiple languages for an application, and switch application languages dynamically at run time. Global graphic objects allows linkages between the appearance and behavior of a graphic object in a global object display to multiple copies of that object in other displays in the same application. Changes made to the original object change the copies as well. Also included are a number of global, object-based process faceplate displays for RSLogix instructions that are commonly used in process applications. These faceplates can be easily added and configured for user applications, reducing development effort.

Rockwell Automation describes its RSView32 HMI offering as a mature, feature-rich HMI. RSView32 supports Windows 95, 98, NT, 2000, XP, Vista, and Windows Server 2003 operating systems. RSView32 features include the integration of Visual Basic for Applications as its built-in programming language. RSView32 can perform as both an OPC Client and as an OPC Server, giving the manufacturers flexibility in integrating the software with controllers and third-party software modules. Also, the reach of RSView32 HMI software can be extended with the remote access capabilities of RSView32 Active Display System and RSView32 WebServer. It also includes a number of other product extensions including TrendX, RecipePro, Messenger, and SPC.

# Siemens

Gleiwitzer Str. 555 90475 Nuremberg, Germany

## www.siemens.com

Siemens has long been a leader in discrete automation and is a leading automation supplier worldwide. Siemens has continued to grow and increase its market share in recent years for both discrete and process automation. Siemens' sheer size, combined with a comprehensive range of products and solutions, provides them with a unique competitive position. Siemens' strategy is to offer customers the benefits of dealing with a single, financial-

WinCC Option Packages	Function
WinCC/Server	For setting up a Client/Server system
WinCC/Redundancy	For increasing system availability
WinCC/Web Navigator	For plant visualization and operation via the Internet
WinCC/DataMonitor	Analyzing and displaying process states on historical data
WinCC/Industrial Data Bridge	Interfacing to both databases and IT systems
WinCC/ProAgent	For fault diagnosis
SIMATIC Logon WinCC/Audit	Options for sector specific expansions of FDA 21CFR Part 11
WinCC/User Archives	For managing user-defined structured data records
WinCC/ODK	For using the open programming interfaces open development kit
WinCC/IndustrialX	For configuration of standardized ActiveX objects
WinCC/Downtime Monitor	Machine data management software
WinCC/Process Monitor	Information system and online quality analysis
Connectivity Pack	IT and business integration by means of a standard interface

Siemens' WinCC Option Packages

ly secure supplier for all electrical products, including automation, drives, switchgear, control gear, and motors. This approach is designed to help manufacturers reduce total cost of ownership while allowing them to focus on their own core competencies.

The Industry Automation (IA) group of Siemens' Industry sector is responsible for the design and production of a wide range of industrial automation products, including PLCs, CNCs, DCSs, industrial PCs, drives, an array of low voltage products and peripheral products, and software ranging from configuration and programming to HMI and MES systems.

IA's goal is to expand its position as a world market leader in automation, drives, switchgear, and installation technology by focusing on innovation and growth. To achieve this, the IA group is strengthening its activities in process automation and in software for complex system controls based on the Totally Integrated Automation (TIA) concept. IA is systematically expanding its product spectrum and industry know-how, penetrating regional markets through strategic acquisitions and business partnerships. The group works with over 800 external solutions providers to tailor its comprehensive solutions to the specific needs of a wide variety of industry sectors.

With TIA, Siemens provides a comprehensive, integrated range of products and systems for efficient automation of the entire production workflow for most manufacturing industries. TIA enables the realization of tailored automation solutions to meet individual production requirements. With the integration features of TIA, companies can optimize their production processes, accelerate time to market, and reduce production and lifecycle costs. TIA minimizes risk in plant equipment investment and overall project complexity.

#### **HMI Software Business**

Siemens' main HMI Software product line is known as SIMATIC WinCC. In 2007, Siemens acquired UGS, which two years earlier had acquired Tecnomatix, which had acquired US Data several years earlier. This acquisition adds the FactoryLink product line of HMI software to the Siemens portfolio. FactoryLink V8 will be available for the next several years. Also, the Austrian company ETM was acquired by Siemens in 2007. ETM's HMI Software product offering is targeted at very large scale applications and for geographically widely distributed systems.

In the HMI Software market, Siemens offers SIMATIC WinCC and WinCC flexible. WinCC Client/Server HMI/SCADA software incorporates Internet technology, open standard interfaces, and configuration tools. WinCC is a scalable application running under Microsoft Windows 2000/XP/Vista. WinCC is used in discrete and process control applications across most manufacturing industries. WinCC is tightly integrated with SIMATIC STEP7 programming software and includes connectivity to SIMATIC PC-based Control WinAC and SIMATIC hardware PLCs. In addition, communication interfaces for all major PLC brands are also available.

In the current version of the SIMATIC WinCC, the process visualization system can be expanded into a centralized, company-wide information hub. This version is scalable and integrates a Historian for archiving of process data. With Plant Intelligence, production monitoring, quality analysis, downtime management, and connectivity tools are offered. With the next generation of Plant Intelligence, seamless scalability with SIMATIC IT will be provided. The WinCC-based planned Maintenance Station will provide proactive maintenance for the plant components. Individualized WinCC applications can be created with standards, such as Visual Basic for Applications (VBA) for automation of engineering tasks and Visual Basic Scripting (VBScript) as a further runtime script language.

Additionally, Siemens introduced two optional packages for SIMATIC WinCC and WinCC Flexible to validate plants according to Food and Drug Administration (FDA) standard 21 CFR Part 11. This standard is quickly becoming a legal stipulation worldwide for production plants in the Pharmaceutical, Food & Beverage, and Fine-Chemicals industries. SIMATIC Logon manages all authorized users plant-wide. SIMATIC WinCC/Audit provides integrated and transparent protocols and documentation for all activities in a plant. This ranges from original user entries to changes of the plant state or plant configuration.

Siemens is positioning WinCC as a modular automation component that is expandable and scalable within the context of their TIA strategy. SIMATIC WinCC has been developed to be expandable by industry-specific and technology-specific options as well as add-ons. Siemens has introduced an entire suite of option packages to add a comprehensive set of modules and features to the basic WinCC application.

SIMATIC WinCC flexible is the innovative HMI software package under Windows for all applications close to machines and the process in machinetools, serial machine-tool building, and plant engineering. The engineering software is based on Microsoft .NET technology and allows users to carry out consistent configuration of all SIMATIC HMI operator panels. In this connection, the operator units range from Micro Panels that are designed for applications with SIMATIC S7-200 controllers (Micro Automation) through to local solutions using SIMATIC Panel PCs and local control rooms with standard PCs. WinCC flexible represents a high level of configuration efficiency with libraries containing object primitives, reusable faceplates, intelligent tools, and automated text translation in the case of multilingual projects. WinCC flexible Runtime offers a cost-effective solution for basic operating and monitoring functions that includes an alarm and logging system and expansion via options on an as required basis. The runtime functions that are available on SIMATIC HMI operator control and monitoring devices (Panels, Micro Panels, Mobile Panels and Multi Panels) depend on the device class. Concepts containing Sm@rtClients and servers allow cross plant access to tags and pictures, distributed operator stations, and remote operation and diagnostics across the Web in conjunction with SIMATIC Operator Panels. WinCC flexible/Audit and Change Control options offer high levels of support to meet the strict quality requirements with respect to both the products to be manufactured and to the manufacturing process.

WinCC flexible shares a common configuration environment that supports the transportability of applications over a wide range of hardware platforms, including standard Windows 2000 / XP and Vista platforms, as well as the Siemens' line of dedicated operator interface platforms.

WinCC Flexible Option	Function
WinCC flexible /Archives	Process value archiving and alarm logging
WinCC flexible/Recipes	For managing data records
WinCC flexible/ Sm@rtAccess	Client/server mechanisms for panels and multi panels
WinCC flexible/ Sm@rtService	For remote control, diagnostics and maintenance via the Internet
WinCC flexible/OPC- Server	For incorporation of automation components
WinCC flexible/ ProAgent	For fault diagnosis
WinCC flexible/Audit WinCC flexible/ ChangeControl	Options for sector specific expansions for FDA 21CFR Part 11

Siemens' WinCC Flexible Option Packages

In the future, Siemens will offer one HMI Software package that will cover scalable platforms from low end operator panels to high end SCADA systems, offering multi-user redundant solutions and Plant Intelligence functionality.

Siemens uses a mixed model to market their HMI Software products, partially via distribution and partially via direct accounts, depending on the countries where the products are sold. Overall, Siemens is well established in most major industries. In North America there is a particular focus on the Automotive, Food & Beverage, machine OEM, and Semiconductor industries.

Siemens continues to pursue broad-based licensing of the Windows CE and XP embedded operating system to target embedded devices for automation applications. This is significant since a collaborative manufacturing environment will rely on embedded intelligence at the device level. The Siemens-Microsoft relationship encompasses a broad range of industrial, communication, consumer, and IT application products.

Windows CE and XP embedded platforms have established a strong niche in the hardened factory floor platform. Siemens was one of the first to leverage this market sector with their Multi Panel SIMATIC MP270 and one the first HMI platforms to be based on the Windows CE Version 5.0 operating system. Now, a wide new range of Panels and Multi Panels are offered based on the newest version of WinCE. The new embedded Panel PC is based on Windows XP embedded. This broad-based move by a company known for developing its own technology echoes the direction of large, typically hardware-bound automation suppliers to leverage commercial technology that already exists in the marketplace.

The number of partnerships and alliances in the automation market will continue to expand as traditional suppliers increasingly acquire the necessary foundation software technology and expertise from outside of their own boundaries. Similar to the Microsoft-Siemens relationship regarding CE, these partnerships typically focus on base platforms such as operating systems and object technology. Automation suppliers are then free to pursue value-added application portions while partners keep the foundation technology up-to-date.

#### Vista Control Systems

2101 Trinity Drive, Ste Q Los Alamos, New Mexico, USA 87544

## www.vista-control.com

Founded in 1989, Vista Control Systems, Inc. is a multi-platform provider of process data acquisition, control, and HMI software tools. These tools allow process control application developers, systems integrators, and end users to create real-time applications with graphical interfaces. Tools con-

Software	Function
Vaccess	Real-Time Memory Resident Database
Vdraw	Graphical Display Creation Tool
Vlogger	High Speed Logging
Vtrend	Trend Viewing of Logged Data
Valarm	Alarming Functions

Vista Control Systems' HMI Software Tools

sist of a distributed, real-time database (Vaccess), graphical display development and deployment tool (Vdraw) and supporting components of high-speed logging (Vlogger), trend viewing of logged data (Vtrend) and alarming (Valarm). There also are utilities to dynamically create, view, and modify the database components, application specifics, and deployed graphical display screens. Vista Controls historically serves a Client/Server market, with

single-seat or server availability for the Windows NT, 2000, XP, Vista, LI-NUX, Solaris, tru-64, and OpenVMS workstations and servers. The company prices their single seat systems competitively, and provides credit on any upgrade to server capabilities, so as not to penalize the user for their growth.

#### **HMI Software Business**

Vista Control Systems' HMI display is either on X-terminals, PCs with Xterminal emulation native Windows, Windows terminal server edition, or by browser on the network. Any and all displays are interchangeable without modification. They can be viewed, modified and/or moved from X to Windows with only the "fonts" being an area of concern due to the restrictions of X. A Java server is now available to give full Vaccess functionality to Java code, and in addition, OPC (Client and Server), JDBC, SQL, and ODBC are supported.

All of Vista Control Systems' server-based systems (OpenVMS, Solaris, Tru64, PowerMAX OS) are designed for unlimited users, unlimited channels (points or tags), unlimited databases, and unlimited I/O connections. Performance has reached 2,000,000 values per second read using Modbus

protocol over TCP/IP and recorded to disk and displayed. This is achieved on a single computer that serves the operator station. Another system has recorded 8,000,000 32-bit values per second, 2.7Tbytes/day using just a portion of a single CPU in a server.

Vsystem Version 4.3 is the current release of their HMI software. This release supports Linux, Windows, Tru64 (Digital UNIX), Solaris, PowerMAX-OS from Concurrent, OpenVMS for VAX, Alpha and Itanium, and continued support for VAXeln. Additionally there is increased functionality for Vdraw, Vlogger, Vtrend, and Vaccess-the real-time memory-resident data-Native Vsystem scanners are available for Kingfisher Series II base. protocol, Modbus, Sixnet, Siemens S7, Allen Bradley, GE Mk VI GSM, and RTP. OPC, with third-party servers, provides the connection to other protocols. The Vsystem product set is sold via capacity-based pricing with unlimited users, unlimited channels (tags), and unlimited databases on all server-based systems. Only on Windows and Linux single user workstations is per seat pricing done. Sites range from single user to site wide usage with an average site of 2-3 server based systems with multiple Windows clients front-ending the servers on a site or project license, not a user basis.

Vaccess is a proprietary memory resident data base with a fully documented API to any of the 64+ fields of any of the 65K channels in the 65K databases (total possible channels 4 billion). Vlogger is the tool that has SQL access to its disk-based binary formatted structure of circular, shared, merged, dynamically opened and/or closed distributed files. Vdraw is tightly integrated to the database, allowing for non-programming access to any channel in any mapped (local or remote) database for dynamic creation, modification and display of a Vdraw screen via native windows on NT, 2000 or XP, or X-terminal protocol on the server-based systems of UNIX's or OpenVMS.

## WEBfactory

Hollergasse 15 74722 Buchen, Germany

### www.webfactory-world.de

WEBfactory GmbH has developed a web based HMI/SCADA software family entitled WEBfactory 2006. WEBfactory provides services for information management in the production environment. WEBfactory 2006 is installed in all regions of the world. WEBfactory core competencies include general and custom application consulting services, practical analysis of processes, fulfilment of complex specifications requirements, workshops and in-house training, and delivery of ready to use software solutions.

#### **HMI Software Business**

WEBfactory's core product is known as WEBfactory 2006, an HMI/ SCADA framework for web-based visualization. The majority of the program

Messaging
Scheduling tasks
High-Bay Racking Control Systems
Materials Management and Control
Special-Purpose Machine Construction
Handling Systems
Conveyance Systems
Measurement Technology

**WEBfactory's Application Focus** 

modules are based on Microsoft .NET technology and Microsoft SQL server 2005. It supports the latest operatsystems from Microsoft, including Vista. ing WEBfactory's open system architecture, with its universal OPC interface and integrated alarm and data management, allows access of information on equipment and production processes through Microsoft Internet Explor-Applications range from industrial automation technology and heating systems to medical applications. The consistent use of HTML/XML/XAML-based technology allows for a variety of networked applications. The information may be accessed from within the network on the Intranet or from any individual workstation.

WEBfactory 2006 includes the WEBfactory Server and the WEBfactory Studio. WEBfactory Server provides a functional, transaction mechanism for bi-directional data transfer between the signal source, located at the process site, and any given HTML/XAML/ActiveX element in Microsoft Internet Explorer. WEBfactory Studio is a projection tool that facilitates the creation of the individual application. It includes a very complete library of controls, an alarm management tool, trending, and analysis functionalities. Alarms may also be transmitted via e-mail, SMS, fax or voice mail.

# Wonderware, Business Unit of Invensys

26561 Rancho Parkway South Lake Forest, California, USA 92630

## www.wonderware.com

Wonderware, founded in 1987, is located in Lake Forest, California with regional offices in North America, Europe, Latin America, and Asia. Wonderware was acquired by Siebe in 1998 and subsequently, Siebe merged with another company, named BTR, to form Invensys in 1999.

Wonderware operates as an independent business unit within Invensys, which includes other business units, such as Invensys Process Systems (Avantis, Foxboro, SimSci-Esscor, Triconex), and Eurotherm. The combination of these businesses address process and batch industries, including Oil & Gas, Chemicals, Power & Utilities, Food & Beverage, Personal Health Care, and the discrete and hybrid manufacturing sectors. Wonderware sells and supports its products through a network of distributors at more than 150 worldwide sales and services offices.

All of Wonderware's most recent products leverage the industry standardsbased ArchestrA technology, in which Invensys has invested tens of millions of dollars in research and development. ArchestrA is an integrated development and software management environment developed by Invensys for the purpose of decreasing the time and costs associated with implementing information and automation projects. ArchestrA technology is designed to extend the life of legacy industrial systems and decrease the costs associated with integrating and evolving systems and applications. By providing a unified application environment, offerings built upon the ArchestrA platform allow manufacturing software solutions to be expanded over time without abandoning prior investments in automation systems, production processes, or intellectual property.

The ArchestrA software architecture offers a single toolset for many industrial and manufacturing applications. The ArchestrA architecture integrates multiple vendors' hardware, software, systems and applications with minimal engineering effort, and facilitates access to all of this information in a user-defined context to provide manufacturing and business intelligence, as well as to enable streamlined manufacturing execution strategies. These applications can scale in functionality, from basic opera-

Software	Function
InTouch Software	Visualization, SCADA, supervisory control, pro- duction management & performance management software
Industrial Computers	Industrial touch panel computers, wireless tablet computers and industrial thin-client touch pa- nels pre-installed with InTouch software in a factory-tested and certified bundled package
System Platform	Unified industrial application platform for real- time data acquisition, MES, plant to business system integration, application object develop- ment & deployment, application modeling, information management, historical archiving, alarm & event and security management
Historian	Real-time and historical plant information repo- sitory built on Microsoft SQL Server technology (2000 & 2005)
Information Server	Plant performance information content server provides correlated plant performance content to Web browsers or virtually any company IT portal. Built on Microsoft SharePoint technology
Manufacturing Execution Module	Production resource management software to monitor, manage and improve WIP and pro- duction yield
InBatch Software	Flexible batch management software automates the execution of production sequences
Equipment Operations Module	Increasing operational discipline by e recording & distribution of production events product ge- nealogy & equipment usage
SCADAlarm	Remote & mobile alarm and event-notification software
ActiveFactory	Provides numerical & trend data analysis, and capability to publish real-time & historical plant information to the Web or company intranet
Equipment Performance Module	Improve asset utilization and performance with insight into OEE and root causes of production down time
QlAnalyst	Reduce variances with SPC analysis software that uses real-time and historical data to moni- tor, predict & adjust for production quality & consistency
Enterprise Integration Application	Integrates diverse manufacturing and business systems such as Oracle & SAP to achieve great- er levels of business productivity
Device Integration	Selection of connectivity options to hundreds of popular control systems

Wonderware's HMI Software Products

tional information management to sophisticated real-time interactions, as well as in size, from a single production line or an entire plant to multiple plants in a supply chain or across multiple facilities.

InFusion is Invensys Process Systems' new enterprise control system that unifies Foxboro's process control, SimSci-Esscor's advanced control and optimization, Triconex safety and critical control, and Avantis asset performance management solutions with Wonderware's supervisory, MES, performance management and production management so-All of these solutions lutions. were built on and integrated with ArchestrA technology. Wonderware differentiates itself by offering a complete range of Supervisory HMI, SCADA and Production & Performance Management Software Solutions that are built upon, and integrated with, a single software architecture.

# **HMI Software Business**

Wonderware offers a comprehensive, integrated set of software products as well as bundled hardware/software combinations that provide efficient and secure monitoring, analysis, and control of manufacturing operations, ranging from a single machine to a network of many plants. Wonderware's software solutions provide scalability, from a single machine to an entire network incorporating in excess of 1,000,000 physical I/O points, without sacrificing ease-of-use or reliability characteristics. Wonderware's Supervisory HMI software, based exclusively on Microsoft Windows-based operating systems, is used extensively throughout the process and discrete industries and has an installed base of over 500,000 applications in over 100,000 plants worldwide. Wonderware software is supported across Microsoft Windows 95/98/NT/2000/XP/2003 and Vista Operating Systems.

Wonderware cites the primary differentiators for their software solutions to be ease-of-use, reliability, and scalability for the end user rather than the incorporation of specific technologies. Wonderware has changed the traditional HMI software packaging model by combining development tools for all of their products into customer oriented bundles for Supervisory HMI, SCADA, and Production & Performance Management, extending the depth and breadth of Wonderware's offerings from supervisory control all the way to enterprise system integration. Wonderware combines integrated process visualization tools with real-time plant information and automation management, Internet connectivity, real-time SQL historical data capture, wide comprehensive device integration and, since 2004, has offered a growing range of Industrial Computers with pre-installed Wonderware software with competitive pricing and packaging. Wonderware's Industrial Computer range includes Touch Panels, Tablets, "Box" PC's, Thin Client computers, and Wonderware Compact Panels based on the Microsoft Windows CE Offering, which offer a wide-range of benefits including faster installation and startup with a factory-tested and certified bundled package, as well as consistent user experience that lowers the costs of maintenance and training.

Wonderware's Production & Performance Management Software provide a manufacturing software solution that enables real-time management of Equipment Operations, Equipment Performance, Manufacturing Quality, Manufacturing Performance, Manufacturing Execution, Batch Execution and Enterprise Integration. Wonderware defines itself by displaying plant process information in the context of production and performance information. Wonderware promotes extensibility through toolkits and the development and adoption of open standards like OPC, ISA-88, ISA-95, ISA-99, OAGIS, MIMOSA, ActiveX technologies, the Microsoft .NET development system, SQL, ODBC, OLEDB, and XML. Wonderware became a
charter member of the OPC Foundation in 1996 and continues to help lead the development and adoption of the latest OPC-UA technology.

Wonderware products support the OPC Client model and also offer a library of over 325 protocol drivers to connect to legacy plant systems and equipment. The most recent version of Wonderware's InTouch visualization software includes Dynamic Operator Guidance, which provides operator guidance and additional functionality to enable users to quickly understand information in the application; Intelligent Alarm Management, with new alarm tools and functionality to enable quicker analysis of alarms, resulting in faster responses; Runtime Language Switching, where users can dynamically switch the language at runtime enabling multi-user, multiglobal standard applications; Fast creation and modification of graphics inside applications to leverage new ArchestrA Symbol enhancements, including pan & zoom & manual graphic positioning capabilities; and Point & Click I/O Failover for fast configuration for a secondary communication server to enable access to real-time information.

In addition to InTouch, Wonderware has released upgrades of its Wonderware Historian and Wonderware System Platform product offering, featuring more efficient data queries via new data retrieval modes; more efficient data storage via new Swinging Door algorithm; improved support for slow & intermittent data networks; enhanced audit trails and security for regulated industry applications; user defined object development that results in less effort to implement functionality for reading, scaling, and manipulation of analog and discrete devices; enhancements in alarm configuration that simplifies the development and maintenance of system wide alarms and operator notifications and reduces the amount of configuration required to accomplish these tasks; single node computer configuration that allows users to start implementing pilots or small systems on a single node and later grow their systems as needed; and support for international versions of Microsoft Windows and SQL Server for expanded application deployment in world-wide markets, including Japanese, Chinese, French, and German.

All of Wonderware's software components work together and complement one another. For example, an HMI view node user can browse data from Wonderware System Platform, Historian and batch management software as well as other InTouch nodes from a common interface, and the user does not need to create local tags to view this data. Wonderware's storage engine is the Wonderware Historian Server, which extends Microsoft's SQL Server for real-time access to factory data. The Wonderware Historian allows for long-term data storage that integrates with other Microsoft server products. Wonderware also offers a feature-rich set of user-friendly SQLbased client applications, which complement the Wonderware Historian Server database for desktop applications, including trending, data browsing and Microsoft Office integration to Word, Excel, and the Web.

The Wonderware System Platform provides a unified environment for visualization, plant history, device communications and application integration, facilitating the development and deployment of applications, and addressing the costs of change management and applications maintenance. Based on ArchestrA and integrated with all other Wonderware products, these technologies provide support for co-existence and migration of current applications, protecting the engineering investment by extending the life of legacy systems, while benefiting from new technology.

Wonderware has embraced thin client computing with the introduction of the Wonderware Information Server software that embeds Microsoft SharePoint technology. Additionally, Wonderware InTouch provides support of Terminal Services. Wonderware expanded their range of offerings with the introduction of an industrial thin-client computer offered in either an ACP ThinManager-ready thin client or a standard Microsoft RDP-based thin client. Wonderware also introduced an industrial Box PC which can also integrate into existing plant automation and information systems. Since this hardware configuration is ArchestrA Ready, it can be a platform node that is part of a distributed Wonderware System Platform network.

Wonderware complements its product offerings with comprehensive programs to train, provide software tools, support, promote and certify thirdparty providers with credentials that acknowledge their skills with Wonderware products. These providers include OEMs, VARs, Independent Software Vendors (ISVs) and over 3,500 Systems Integrators (SIs). Wonderware's third-party programs are designed to enable their customers to identify companies and individuals with the aptitude and resources to develop Wonderware solutions for their businesses with reduced risk.

#### **7-Technologies**

Bistruphave 3 3460 Birkerød, Denmark

#### www.7t.dk

7-Technologies A/S, founded in 1984, is an independent software company with 36 employees and with annual sales of 35 million Danish kroner. 7-Technologies has ambitious goals for the continued development of the company internationally. 7-Technologies builds its business on a strategy in which software is sold and implemented by a network of global partners and system integrators. 7-Technologies develops and sells several technical software products for industrial automation, including IGSS, AQUIS/TERMIS, and LIQUIS.

#### **HMI Software Business**

IGSS is a state-of-the-art SCADA system designed to meet the demanding requirements of industrial plants regarding monitoring and control. An IGSS process control system can be scaled from the smallest single-user version with just 100 objects to a multi-user version with standby redundancy and more than 50 concurrent operator stations, 50,000 objects, and more than 250,000 tags. The product is sold to a wide range of industries, and more than 27,000 plants today have IGSS installed. IGSS differentiates itself from competitors with its unique data collection capability and its easy to use configuration facilities.

AQUIS/TERMIS is a software tool for modeling, simulation and optimization of drinking water facilities. Today, AQUIS/TERMIS has been sold to water treatment facilities located in more than 2,000 cities around the world with a combined population of more than 100 million inhabitants. LIQUIS is a software tool used for the control and monitoring pipelines for industries, such as Oil & Gas.

Most of the staff involved in developing these unique products are still with 7T. This gives 7T customers the benefits that the products are being developed by not only a very experienced staff, but also that 7T can assist their partners and system integrators with specialist knowledge and indepth technical support.

# Appendix A: Methodology

Over the past two decades, ARC Advisory Group has become the leader in providing in-depth and accurate market intelligence for the industrial automation marketplace. From the beginning, our corporate goal has been total client satisfaction. We have continuously strived to refine and improve our vision of future plant automation systems. To meet the growing need for global market intelligence, we have recently expanded our services to cover the international marketplace.

ARC's research database is based on thousands of user surveys, telephone interviews, plant visits, and in-depth profiles of hundreds of suppliers and users. Our extensive network of industry contacts has been an invaluable asset in filtering out long-term trends from fads. Our consultants are skilled in analyzing and forecasting the impact of new technology and products on plant automation systems. We systematically study each market segment before developing specific recommendations for our clients.

ARC consultants follow technology and industry events on a daily basis, and have a broad range of expertise in all areas of industrial automation, including sensors, control systems, networks, computers, software, and services. We are experienced in working with all types of manufacturing processes including continuous, batch, discrete repetitive, and job shop.

Each year, ARC consultants attend the most important trade shows around the world. In addition, ARC consultants attend press conferences held by most major suppliers and review hundreds of news releases each year. ARC consultants then sort out real and long lasting trends in the marketplace.

ARC uses a five step approach to conduct global market research for the industrial automation marketplace. This approach provides our staff with a solid framework to formulate meaningful strategies for our clients. You can be assured that we give all areas of the study a considerable amount of time and thought before moving on to the next step. The following contains a brief description of how we conduct each of these five steps.

# Step 1: Client Inputs and Secondary Search

ARC started this project by inviting inputs from our primary clients and researching all secondary sources of information. Key secondary sources researched include the following.

#### **ARC Database**

ARC maintains a proprietary database on the industrial automation marketplace. This database provides our staff with a solid base to start their research project. The database includes the following information on several thousand companies:

- Annual Reports
- 10K and other Financial Reports
- Client Lists
- Price Lists
- Published Secondary Data on Companies and Products
- Market Size and Forecast Data
- Market and Technology Trend Data

#### Literature Search and Review

ARC subscribes to over 150 magazines and newspapers covering a wide range of topics relevant to the industrial automation community, as well as an extensive library of directories and books. We are on the news and product release mailing lists of every key user and supplier in the marketplace today. We sort and file important news and articles for future use. We research and analyze our in-house database and the prominent publications relevant to this study to identify:

- Issues of interest pertaining to the study
- Product and technology trends in the industry
- Changing user needs
- Manufacturer's products and key individuals within the study's scope

#### **Sales and Financial Literature Requests**

ARC requests capability brochures, catalogs, data sheets, application notes, and price lists from all known or potential manufacturers and suppliers of products pertinent to a study. We also request the following financial reports when needed:

• Annual reports

- 10K statements
- Prospectus and investment analyses

Our studies evolve rather than being forced. This assures you that the results are accurate, up-to-date, and meaningful.

#### Step 2: Identify Key Issues

After discussions with clients and a careful review of all secondary information, ARC developed a list of key issues concerning both users and suppliers. In terms of elapsed time, ARC spent several weeks discussing issues pertinent to this study with the leading suppliers. We also capitalized on information contained in our previous market research reports and seminars on process control.

#### **Step 3: Gather Primary Data**

#### **Supplier Survey and Interviews**

First, we conducted a top down analysis of the leading suppliers' products and various businesses in order to get a better understanding of the global business environment. Then we conducted telephone interviews with key individuals at all major suppliers. Where possible or necessary, we interviewed more than one person at each company to verify the accuracy of the information. We interviewed individuals typically engaged in one of the following functions at these companies:

- Product management
- Marketing management
- Product planning
- Sales management

# Automation Profiles of the Leading Edge OEMs and Manufacturing Companies

ARC has compiled automation profiles of the leading edge OEMs and manufacturing companies. Some highlights of the information that is included in these profiles are:

- Plant automation budget of the company and how it is likely to change over the next five years.
- Open systems implementation plans and preferences of the company.

- What the top automation priorities are for the company and what portion of the budget is likely to be spent on control systems, sensors, computers, software, and systems integration.
- Enterprise-wide integration plans and strategies of the company by geographic region.
- Company preferences for different types of control systems, computers and software.

## Step 4: Data Analysis

We organized and entered all gathered data into a computer database. The data was verified, sorted and cross-tabulated in numerous ways to filter out industry trends and answers to the key issues identified earlier.

After analyzing all market data, we prepared preliminary market forecasts. At this time, we considered many alternative scenarios and tested them against some key criteria. Finally, we chose the most accurate scenario.

#### **Step 5: Prepare Final Report**

After finalizing market forecasts, we drew charts and graphs to get further insight into user needs and wants. We spent a considerable amount of time and effort to draw conclusions and sort out long-term trends from fads. Finally, after we considered many different strategic alternatives, we developed recommendations for the industry participants.

## **Benefits of ARC's Methodology**

Key benefits of ARC's methodology in conducting market research are:

- This is a proven approach and is designed specifically to conduct global market research for the industrial automation marketplace.
- Our staff members do all our research work. The ARC staff has firsthand industry knowledge and experience. Our staff's average level of industry experience is over twenty years.
- ARC actively solicits inputs from suppliers and users throughout the duration of a project.
- Our experienced staff conducts all interviews not someone with absolutely no knowledge of the industry.
- We encourage independent thinking by our staff members.

- We can identify key individuals for interviews quickly and accurately through our extensive network of industry contacts and data base.
- We can complete each task very efficiently through our use of automated resources.

# Appendix B: Common Industry Abbreviations

4GL	Fourth Generation Language
μP	Microprocessor
3PL	Third Party Logistics
A/D	Analog-to-Digital
ABC	Activity Based Costing
AC	Alternating Current
ActiveX	Object-Oriented programming language for Internet
Ada	Programming Language (named after Ada Lovelace)
AEC	Architect, Engineer & Constructor Firm
AEGIS	Abnormal Event Guidance Information System
AGC	Automatic Guidance Control
AGV	Automated Guided Vehicle
AI	Artificial Intelligence
ALARP	As Low as Reasonably Practicable
ANSI	American National Standards Institute
APC	Advanced Process Control
API	Application Program Interface
Applet	Small Software Application or Component
APS	Advanced Planning & Scheduling
ARPANET	Predecessor to Internet
AS/RS	Automatic Storage & Retrieval Systems
ASIC	Application Specific Integrated Circuit
ASM	Abnormal Situation Management
ASN	Advanced Shipment Notice
ASP	Application Service Provider
ASP	Average Selling Price
ATM	Asynchronous Transfer Mode
ATP	Available-To-Promise
B2B	Business-to-Business
B2C	Business-to-Consumer
BIOS	Basic Input/Output System
BISYNCH	Binary Synchronous Communication
BOL	Bill of Lading
BOM	Bill of Material
BOOT	Build, Own, Operate, and Transfer
BPA	Business Process Automation

BPE	Business Process Engineering
BPO	Business Process Outsourcing
BPR	Business Process Reengineering
C++	Object Oriented Programming Language
CAD	Computer Aided Design
CAE	Common Application Environment or Computer Aided Engineering
CAGR	Compound Annual Growth Rate
CAM	Computer Aided Manufacturing
CAN	Controller Area Network
CapEx	Capital Expenditure
CASE	Computer Aided Software Engineering
CBT	Computer-based Training
CD	Computer Disc
CDDI	Copper Distributed Data Interchange
CDE	Common Desktop Environment
CD-ROM	Compact Disk, Read Only Memory
CDV	Committee Draft Vote
CEMS	Continuous Emissions Monitoring System
CENELEC	Committée de European de Normalization Electrotechnique
CEO	Chief Executive Officer
CFM	Continuous Flow Manufacturing
CFR	Code of Federal Regulations
CIM	Computer Integrated Manufacturing
CISC	Complex Instruction Set Computing
CLN	Collaborative Logistics Newtork
CM&C	Cell Monitoring & Control
CMMS	Computerized Maintenance Management Systems
CMOS	Complementary Metal Oxide Semiconductor
CNC	Computer Numerical Control
COM	Component Object Model
Component	Software Object containing Data and Method
CORBA	Common Object Request Broker Architecture
COSE	Common Open Software Environment
COTS	Commercial Off-The-Shelf
CPFR	Collaborative Planning, Forecasting, & Replenishment
CPG	Consumer Packaged Goods
CPI	Chemical Process Industry
СРМ	Collaborative Production Management
CPN	Collaborative Partner Network
CPU	Central Processing Unit

CRAR	Collaborative Forecasting & Replenishment
CRM	Customer Relationship Management
CRP	Capacity Requirements Planning
CRT	Cathode Ray Tube
CSA	Canadian Standards Association
CSI	Current Source Inverter
CSR	Customer Service Representative
СТР	Capable-to-Promise
D/A	Digital-to-Analog
DAS	Data Acquisition System
DC	Direct Current
DC	Distribution Center
DCE	Distributed Computing Environment
DCOM	Distributed Component Object Model
DCS	Distributed Control System
DD	Device Description
DDE	Dynamic Data Exchange
DDL	Device Description Language
DE	Digitally Enhanced
DIN	Deutsches Institut für Normung
DLL	Dynamic Link Library
DMZ	De-militarized Zone
DNA	Microsoft's Distributed iNternet Architecture
DP	Differential Pressure
DRAM	Dynamic Random Access Memory
DRP	Distribution Resource Planning
DSD	Direct Store Delivery
DSP	Digital Signal Processor or Digital Signal Processing
DTD	Document Type Definition
DVD	Digital Versatile Disc
E-Business	Electronic On-line Business
E-Commerce	Electronic On-line Commerce
EAI	Enterprise Application Integration
EAM	Enterprise Asset Management
EAS	Electronic Article Surveillance
EC	Electronic Commerce
ECR	Efficient Consumer Response
eCRM	Electronic Customer Relationship Management
EDI	Electronic Data Interchange
EDM	Electronic Data Management or Electrical Discharge Machine

eFPM	E-Fulfillment Process Management
eFS	E-Fulfillment Solutions
eIS	E-Integration Solutions
EL	Electroluminescence
EMI	Electro Magnetic Interference
EMS	Energy Management System
EOS	Economy of Scale
EPA	Environmental Protection Agency
EPC	Electronic Product Code
EPC	Engineering, Procurement, and Construction
EPM	Enterprise Production Management
ePS	E-Procurement Solutions
EPS	Enterprise Production System
ERP	Enterprise Resource Planning
ESD	Emergency Shut Down System
EU	European Union
FA	Factory Automation
FCS	Field Control System
FDA	Food & Drug Administration
FDC	Factory Data Collection
FDDI	Fiber Distributed Data Interchange
FF	Fieldbus Foundation
FIP	Factory Instrumentation Protocol
FMP	Flexible Manufacturing Plant
FMS	Factory Management System or Factory Message Specification
FORTRAN	Programming Language
FT-IR	Fourier Transform Infrared
FTC	Federal Trade Commission
FTP	File Transfer Protocol
GC	Gas Chromatography
GEMS	Global Enterprisewide Management System
GIS	Geographic Information Services
GLS	Global Logistics System
FSK	Frequency Shift Key
GMC	General Motion Control
GMP	Good Manufacturing Practice
GOSIP	Government Systems Interconnect Protocol
GPS	Global Positioning Satellite
GP	Gauge Pressure
GPS	Global Positioning System

GTO	Gate Turn Off Thyristor
GUI	Graphical User Interface
HAL	Hardware Abstraction Layer
HART	Highway Addressable Remote Transducer
HAZOP	Hazard & Operability
HDLC	High Level Data Link Control
HDTV	High Definition Television
HMI	Human Machine Interface
HP	Horsepower
HPI	Hydrocarbon Processing Industry
HTTP	HyperText Transport Protocol (Internet)
HVAC	Heating, Ventilating, Air Conditioning
H/W	Hardware
I/O	Input/Output
IA	Industrial Automation
IC	Integrated Circuit
IEC	International Electrotechnical Commission
IEEE	Institute for Electrical & Electronic Engineers
IFP	Intelligent Front Panel
IGBT	Insulated Gate Bipolar Transistor
Internet	Worldwide network of loosely connected and diverse computers
Intranet	Internet implementation within an enterprise
IP	Internet Protocol
IPO	Initial Public Offer
IR	Infrared
ISA	International Society for Measurement & Control
IR	Independent Representative
ISA	Instrument Society of America
ISFET	Ion Sensitive Field Effect Transistor
ISO	International Standards Organization
ISP	InterOperable Systems Project
ISV	Independent Software Vendor
IT	Information Technology
JAVA	Object-Oriented programming language for Internet
JCAF	Java Control & Automation Framework
JEIDA	Japan Electric Industry Development Association
JEIF	Japan Electrical Industrial Federation
JEMA	Japan Electrical Manufacturers' Association
JEMIMA	Japan Electrical Measuring Instruments Manufacturers' Association
JISC	Japanese Industrial Standards Committee

Just-In-Time
Java Virtual Machine
Kilo Hertz
Kilo Volt Ampere
Kilowatt
Local Area Network
Liquid Crystal Display
Light Emitting Diode
Logistics Execution System
Load Commutated Inverter
Last In, First Out
Laboratory Information Management System
Large Scale Integration
Less Than Truckload
Milliamp
Main Automation Supplier
Manufacturing Execution System
Management Information System
Millions of Instructions Per Second
Multi-Loop Controller
Manufacturing Message Specification
Metal Oxide Semiconductor Field Effect Transistor
Management of Change
Master Production Schedule
Microprocessor Unit
Maintenance, Repair & Operations
Materials Resource Planning
Manufacturing Resource Planning
Material Safety Data Sheets
Mean Time Between Failure
Make to Order
Multivariable Predictive Control
Multivariable Control
Machine Vision System
Normal Ausschultz Fur Messung Und Regelung
North American Free Trade Association
North American Industry Classification System
Network Computer (Internet) or Numerical Control
National Electrical Manufacturers' Association
National Institute of Standards and Technology (USA)

NN	Neural Networks
NTE	Microsoft's Windows NT Embedded Operating System
NTE	National Transportation Exchange
NURBS	Non-Uniform Rational B Splines
OA	Office Automation
OCX	OLE Custom Control
ODBC	Open Database Connectivity
OEM	Original Equipment Manufacturer
OI	Operator Interface
OLE	Object Linking and Embedding
OMAC	Open Modular Architecture Control
OMG	Object Management Group
OMS	On-line Management System
00	Object-oriented (Analysis, Design or Programming)
OPC	OLE for Process Control
OS	Operating System
OSF	Open Software Foundation
OSHA	Occupational Safety & Health Administration
OCS	Open Control Systems
ORP	Oxygen Reduction Potential
OSF	Open Software Foundation
OSI	Open Systems Interconnect
PAS	Process Automation System
PC	Personal Computer
PCS	Process Control System
PD	Positive Displacement
PDM	Project Data Management
P&ID	Process and Instrumentation Diagram
PES	Process Electrochemical Systems
PID	Proportional Integral Derivative
PIM	Plant Information Management
PIMS	Process Information Management System
PIP	Partner Interface Process
PLC	Programmable Logic Controller
PM&C	Process Monitoring & Control
PMD	Programmable Message Display
POSIX	Portable Operating System Interface
PPP	Point-to-Point Protocol
Profibus	Process Fieldbus
PSI	Pounds per Square Inch

PSM	Process Safety Management
РТР	Profitable-to-Promise
PWM	Pulse Width Modulation
QC	Quality Control
QR	Quick Response
R&D	Research & Development
RDBMS	Relational Database Management System
Rep	Independent Representative
RFDC	Radio Frequency Data Communications/Collection
RFID	Radio Frequency Identification
RFI	Radio Frequency Interference
RFP	Request for Proposal
RFQ	Request for Quote
RISC	Reduced Instruction Set Computing
RLL	Relay Ladder Logic
ROA	Return on Assets
ROI	Return On Investment
ROM	Read Only Memory
RPC	Remote Procedure Call
RPM	Revolutions Per Minute
RT	Real-time
RTD	Resistance Temperature Detector
RTOS	Real-time Operating System
RTU	Remote Terminal Unit
RTX	Real-time Extension
SAMA	Scientific Apparatus Makers Association
SCADA	Supervisory Control and Data Acquisition
SCE	Supply Chain Execution
SCM	Supply Chain Management
SCP	Supply Chain Planning
SCPM	Supply Chain Process Management
SCR	Silicon Controlled Rectifier
SDLC	Synchronous Data Link Control
Sercos	Serial Real-time Communication System
SFA	Sales Force Automation
SFC	Shop Floor Control or Sequential Function Chart
SI	Systems Integrator or Systems Integration
SIC	Standard Industrial Classification
SIL	Safety Integrity Level
SIS	Safety Instrumented System

SIS	Short-Interval-Scheduling
SKU	Stock Keeping Units
SLA	Service Level Agreement
SLC	Single Loop Controller
SLDC	Single Loop Digital Control
SLIP	Serial Line IP
SmallTalk	Object Oriented Programming Language
SMP	Symmetrical Multiprocessing
SMT	Surface Mount Technology
SoftLogic	PC-based Logic Control
SOP	Standard Operation Procedure
SP50	Standards & Practice Committee No. 50 (ISA)
SPC	Statistical Process Control
SQC	Statistical Quality Control
SQL	Structured Query Language
SSH	Secure Shell
SSL	Secure Socket Layer
S/W	Software
ТВР	Transaction Based Payments
T/C	Thermocouple
TCO	Total Cost of Ownership
TCP/IP	Transmission Control Protocol / Intenet Protocol
TCT	Total Cycle Time
TIE	Technical Information Exchange
TL	Truckload
ТМ	Transportation Management
TMS	Transportation Management System
ТОР	Technical and Office Protocol
TQC	Total Quality Control
TQM	Total Quality Management
TUV	Technischer Uberwackungs Verin (Technical Inspection Association)
TVO	Total Value of Ownership
UEM	Unified Enterprise Management
UL	Underwriters Laboratories
UML	Unified Modeling Language
UPC	Uniform Product Code
URL	Uniform Resource Locator (Internet)
USB	Universal Serial Bus
UV	Ultraviolet
VAN	Value Added Network

USP	United States Pharmacopeia
VAR	Value Added Reseller
VAS	Value Added Services
VBX	Visual Basic custom control
VCI	Value Chain Initiative
VDU	Visual Display Unit
VF	Vacuum Fluorescent
VFD	Variable Frequency Drive
VICS	Voluntary Inter-Industry Commerce Standard Committee
VLSI	Very Large Scale Integration
VMI	Vendor Managed Inventory
VoIP	Voice Over Internet Protocol
VPN	Virtual Private Network
VSD	Variable Speed Drive
VVI	Variable Voltage Inverter
VVVF	Variable Voltage, Variable Frequency
WAH	Web Application Hosting
WABI	Windows Application Binary Interface
WAN	Wide Area Network
WIP	Work In Process
WM	Warehouse Management
WMS	Warehouse Management System
WOSA	Windows Open Systems Architecture
WWW	World Wide Web (Internet)
XML	Extensible Markup Language
Y2K	Year 2000