ECS SOLUTIONS INC.

BATCH MANUFACTURING EXPERTS FOR THE LIFE SCIENCE INDUSTRIES

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WHO WE ARE

After more than three decades developing batch process control systems using a total process automation approach, we have the experience and expertise it takes to build powerful, high-performing plants that produce high-quality yields. We could probably do it in our sleep!

But that's not the part of our business that sets us apart.

Yes, our experience has taught us just about everything there is to know about how to create reliable systems for batch process control. It's also taught us how to deliver them faster and more efficiently than anyone else. But most important, it's taught us how to deliver the flexibility that makes it easy for companies to optimize their processes – quickly editing and adding recipes, modifying process cell equipment models, and leveraging automation to increase equipment effectiveness. That flexibility is the key to maximizing OEE and lowering total lifecycle cost. We've distilled the lessons learned from working on thousands of process control projects into a streamlined solution that takes the custom programming out of process control, making systems faster and cheaper to build, more cost-effective to run, and easier to use.

It's the advantage you can only get with a systems integrator who has as much experience as we have – and who has turned that experience into a flexible solution for better process control. That's the unique combination of long experience and practical application that sets us apart from all others.

ECS was founded in 1977 to provide control and information system solutions, initially to the demanding aluminum manufacturing industry. Since then, the company has expanded to deliver batch and continuous process control solutions to a wide range of manufacturing companies. To date, we have delivered more than 3500 projects.

A key part of ECS' journey has been to simplify batch creation and additions by developing S88 Builder® software to address gaps in ISA-88 equipment control software technology. S88 Builder reduces complexity at the back and front ends of batch processing, increasing system flexibility to respond to change and freeing operators to work more efficiently and productively.

WHO WE ARE

WHAT WE DO

TOTAL PROCESS AUTOMATION

ECS' value-focused **Total Process Automation** solutions are built on the lessons of 40 years of hands-on experience with process automation systems. Only ECS brings together faster deployment, increased efficiency, and ongoing agility – to reduce costs, raise product quality, and deliver greater value and higher profitability over the long term.

The result is highly efficient project delivery at the outset, and greater equipment effectiveness and operator productivity, yielding increased profitability, throughout the lifecycle of the system. A lower price puts money in your pocket once; value-focused Total Process Automation puts money in your pocket every year.

TPA Values
- Building on six key principles
- Maximizing value and flexibility
- Leveraging previous development

TPA Applications
- Avoiding "islands of automation"
- Deploying with partner SPs

ISA-88 Done Right
- Separating procedure and equipment programming
- Aligning equipment programming with a physical model

Distributed Control
- Enhancing control for Plant PAx
- Improving on the traditional DCS

ECS Solutions is a **CSIA** certified control systems integration firm that has delivered effective process automation solutions for the **Life Science Industries**.

WAHT WE DO

We have experience delivering:

- Clean In Place (CIP)
- Sterilize In Place (SIP)
- Batch Automation
- Blending
- Reactors
- Formulation
- Filtration
- Portable Tanks
- Weigh and Dispense
- Manual Electronic Work Instructions
- ERP interfaces
- Inventory management
- Track & Trace
- Overall Equipment Effectiveness (OEE)
- Production scheduling
- Drying
- Packaging
- Palletizing

How do we accomplish this? We have separate, dedicated teams that focus on specific disciplines to maximize project/service execution:

- **Process Automation Consulting**
  - Total Process Automation Assessment (TPAA)
- **Batch Process Automation**
  - S88 Builder (model-based process control system)
  - Campaign Management
  - CIP Management
  - Material Management
  - Kitting Management
  - Packaging Management
- **Manufacturing Operations Management**
  - Batch Management
  - ERP Integrations
  - Production Data Collection
  - Production Performance
  - Production Scheduling
  - Material track and trace
- **Industrial Automation**
  - Process Automation
  - Optimization
  - Migrations

BATCH MANAGEMENT

A batch management software package is a key component of an ANSI/ISA-88 (S88) batch production system. A batch management package manages execution of ANSI/ISA-95 (S95) manufacturing operations management activities. System integrators have significant leeway in how they configure batch management software packages to manage a specific batch process.

All system integrators are NOT equal. Writing a single program that can control any batch process requires infinitely deeper and broader understanding of S88 than does writing a single-purpose or custom program. Systems built on S88 Builder reflect S88 to the letter.

When properly implemented, batch management is:

- Efficient at managing batch process equipment
- Effective at producing consistently high-quality products
- Flexible to produce future, undefined products efficiently and effectively with minimal reconfiguration

Whether or not a batch management solution includes S88 Builder, ECS offers significant S88 knowledge and experience to its customers.

Schedule a free review of your process with an experienced ECS engineer to learn how you can create more value with your process.

BATCH MANAGEMENT

BATCH MANAGEMENT CONT'D

S88 BUILDER®

S88 Builder is a basic model-based process control system used specifically for equipment control in a batch or continuous process control system. Based on best practices and 40 years of experience, ECS developed S88 Builder to be one common application for controlling any process cell.

The model provides the provides an extreme level of both consistency and flexibility for equipment control throughout a process. The consistent model optimizes your process control system for top performance and quality, which lowers production costs and increases equipment availability.

Key Benefits

- Unit panel turns operators into focused process managers with flexible live tiles for each unit equipment module
- Alert navigator draws operator attention to any unit held from processing for any reason
- Unit logs track operator actions and augment the electronic batch record
- Fast and easy configuration, in lieu of programming, delivers radically shorter schedules and extreme agility to implement new products
- Model backup is accomplished using standard SQL tools

How it Works

S88 Builder has three components: **(1)** studio, **(2)** engine and **(3)** faceplates and objects.

Taking data from the P&IDs, a user configures the data model of the process inside the S88 Builder Studio. The data model is downloaded from the S88 Builder Studio to the S88 Builder Engine, the one ControlLogix PAC program that can control any process. S88 Builder faceplates and objects adapt to the data in the ControlLogix PAC, provide the operator visualization into the process, and allow the operator control of the equipment. S88 Builder adheres strictly to the ISA-88 standard and provides phase level, equipment module level, and control module level control of all equipment. S88 Builder can connect to any ISA-88 compliant batch management system via OPC for procedural control.

OUR TEAM

ECS is a recognized leader in the delivery of process control systems, having achieved that status by aggressively pursuing solutions that provide the information and controls our customers need to manufacture more product faster and at a lower cost. We understand that rapid developments in technology necessitate new approaches to control systems – approaches that allow people to filter and consume information quickly so they can make the best decisions and take immediate action to follow those decisions through. Our 40+ Engineers and leadership team are focused on adding value to our customers' process and ultimately improving their bottom line.

Tim Matheny, P.E. – President

Tim has more than 33 years of software engineering and consulting experience. Working for ECS in a variety of roles since 1982, he has served as president for the past 24 years. Tim holds a degree in mechanical engineering from Rose-Hulman Institute of Technology. He also completed the lay minister certification program at Concordia University Wisconsin. Tim started Engineer Our Future, a collaboration of workforce and economic development entities, high school teachers, business leaders, and college students.

Randy Otto – Vice President, Business Development

Randy brings to ECS more than 25 years of experience in diverse industries, including glass fibers manufacturing and custom assembly machine manufacturing. Before joining ECS, Randy spent 10 years managing the delivery of assembly equipment for Integrated Systems Manufacturing and process control systems for Premier System Integrators. For most of the last 12 years, he has managed business development and sales for ECS. Randy graduated from Purdue University with a degree in electrical engineering technology. He has an MBA from the University of Southern Indiana.

Kurt Daunhauer – Vice President, Operations

Kurt has more than 27 years of experience integrating process control solutions for a variety of industries. He has managed ECS' operations since 1995. Before that, he spent nine years delivering material handling solutions for Pentek Corporation and drive and motion systems for Flanders Electric Engineering. Kurt graduated from Purdue University with a degree in electrical engineering technology.

OUR TEAM CONT'D

John Parraga – Batch Process Specialist

Already an elite process control integrator, ECS strengthened that position this week with the addition of John Robert Parraga. John is an experienced process, particularly batch process, engineer with career stops at Sequentia, the firm that gave the world batch management as we know it, and Rockwell Automation. At Rockwell Automation John held several roles. As a Global Process Technical Consultant, John advised many customers and integrators on the best way to control their processes. As the FactoryTalk Batch product manager, John was part of the PlantPAx leadership team. As a sales person focused on the life science industry, John was able to apply his knowledge in a different but rapidly growing area of process manufacturing. John has participated in a number of organizations over the years. His published paper on recipe based clean-in-place remains a standard for implementing the best and most efficient clean-in-place control systems.

Jordan Stoltz – Engineering Lead

Jordan graduated from the University of Evansville with a B.S. in Computer Engineering. Jordan began working for ECS as an intern and has been a full-time engineer for ECS since his graduation. Jordan has worked on a wide variety of integration projects for ECS, with a focus on Batch Processing. In addition to base skills in PLC programming and SCADA system design, Jordan also has significant experience working with custom SQL based material management solutions, MES systems, Rockwell's FactoryTalk Batch software suite, and ECS' S88 Builder product. Jordan has been involved in large scale batch processing projects in many capacities, from the sales/quoting cycle to development, startup, service, and support.

Jeff Harpenau – Engineering Lead

Jeff has 25 years of automated manufacturing, and process control experience, in high volume discrete manufacturing, material handling, power plant systems, and food and beverage processes. He started his career at Siemens EC designing and programming high volume automation lines. For most of the last 18 years his experience focused in process control and system integration of material handling and batch processes. Jeff graduated from the University of Southern Indiana with a degree in Electrical Engineering Technology, and has since returned to obtain a Master's in Industrial Manufacturing (MSIM), focusing on lean manufacturing.

OUR TEAM CONT'D

Mario Alvarado – Systems Engineer
Mario has 13+ years' experience with process control systems and batch management specializing in the Food and Beverage industry. Mario has been a speaker at the World Batch Forum and led large Batch Manufacturing projects while in South America, serving as the technical authority for that Region with Rockwell Automation. Areas of expertise include process controls, visualization software, batch management and integrated architecture systems.

Armando Di Francesco – Systems Engineer
Armando has 20+ years of experience in a wide range of industries including Automotive, Food & Beverage, Life Science, Oil and Gas, and Chemical and has worked on projects all over the world. Armando was introduced to Rockwell RS Batch in 1999 by ECS Batch Process Specialist, John Parraga, and is a Batch Expert. He previously worked as Director and Technical Manager for ALTRA Systems. Armando has an Electrical Engineering degree, along with master's degree in process control.

Phillip Michel - System Engineer
Phil graduated from Purdue University with a degree in electrical engineering technology and has 28 years of experience in integrated and process automation with Rockwell and Siemens controllers. Before coming to ECS, Phil worked 10 years for a subsidiary of Siemens and then, after starting his own controls company for a few years, came to ECS where he has worked for the past 16 years. Phil is also an expert with Visual Studios and SQL Server and is a co-inventor of ECS' S88 Builder product which fully implements Rockwell's Factory Talk Batch's OPC interface and provides the middleware between batch and the factory I/O.

Kyle Miller – Engineering Lead
The youngest member of the Batch Brothers, Kyle has 7 years of experience in process automation control. In that time, Kyle has been exposed to and learned Batch in several control systems and environments. ECS hired Kyle immediately after graduation from the University of Evansville with a BS in Electrical Engineering.

OUR TEAM

EMPLOYEE DEVELOPMENT

Employee Development Model

ECS has developed a model for employee development. The model is broken down into four primary skills areas including:

- Technology
- Project Management
- Leadership
- Commercial

Each skills area contains a detailed list of skills and experience metrics used to form the basis of our job descriptions. These metrics are used on job descriptions as well as during the employee review and goal setting processes.

Employee Training

Structured classroom or self-directed training has its important place. However, engineers are hands-on people. Experiential, mentored, training is by far the most effective way to cement learning. Mentored training is encouraged at ECS in two primary ways—

- ECS' key behavior of serving others and team culture embraces mentoring
- Because ECS' project cost accounting system uses actual costs, projects can easily remain profitable and pay project bonus (2.4.1 below) when hours are worked by junior team members. During a new employee period, costs are accrued at ½ actual.

ECS has developed a full suite of training courses taught by our own employees. Each course fits into one of the four primary skills areas in our employee development model. Training provided by professional instructors is offered to all employees. Employees can establish a training/improvement plan with their supervisor that encompasses one or more classes. A monetary bonus is attached to completion of the plan, particularly if the plan includes a certification.

EMPLOYEE DEVELOPMENT

EMPLOYEE DEVELOPMENT CONT'D

Goals and Career Planning

Employee goals are established to be aligned with company goals that are shared with all employees. Employees are given tools to help them track their developmental goals and activities. These tools include notes for past and upcoming performance reviews, individual monthly assessments, and skills training records.

Internship Program

ECS has employed engineering students as part of a Summer Internship Program for several years. This program is set up to allow students to learn more about controls systems integration and how engineering principles are applied in a manufacturing setting.

The program also allows ECS to evaluate students as potential full-time employees. When past interns are hired as full-time employees, their familiarity with our staff, culture, and technology we use, allows them to have a substantially quicker transition to being fully productive. Turnover among such employees is very low.

Students are assigned a mentor for the duration of their internship. Goals are established at the beginning and tracked during the course of the internship. At the end of the internship, students are required to give a presentation to the ECS management team summarizing their experience.